NATIONAL PETROLEUM NEWS

Vol. XIX Cleveland, Ohio, February 9, 1927 No. 6

Seminole's Peak Not Yet in Sight; Yield Already 17 Million

By Lawrence E. Smith and A. F. Hinton

N. P. N. STAFF WRITERS

TULSA, Feb. 5

OUT of the confused and chaotic industrial struggle that makes up the Seminole district of today slowly there emerges the conviction that this area will take rank with the greatest of all the fields that make up the petroleum history of the United States.

Just within the past two weeks the industry has become "Seminole conscious." Expressions to the effect that the field was "another Cushing," another this and that, were heard frequently last fall about the time that pipe line facilities were congested to the point that a partial shutdown and a proration of production was put into effect by the operators. The effect of this was to delay completions and there was something of a tendency to forget potentialities for a time. Then the lightning struck again.

Now, with a daily production of nearly a quarter million barrels and still climbing, it is any man's guess what will be the final high. The prophets have thrown away the tools with which they ordinarily work and have joined the crowd who merely name a figure—any figure that comes to mind.

There are so few of the factors now in sight with which the performance of an area can be computed with fair chance of being about right that anyone who attempts to present an orderly, reasoned statement on the district's future finds himself confronted with a total lack of information or historical background on some vital point.

THUS it is that the guesser who says he will wager some money that the peak of the district will be 400,000 barrels is given as respectful hearing as the man who puts it 100,000 barrels lower. Some who bet on a high mark of 250,000 barrels last fall, and were considered to be out on a limb, are now about to collect and the end apparently is far away, unless something happens that is not in the line of probability now.

Nothing like this district has heretofore been developed in the Mid-Continent, hence computations on the basis of what happened in Tonkawa, Garber, Wewoka or any other Wilcox sand pool, are idle and valueless.

Important above all else at this time, of course, is the economic effect. Will it break the market? It did once before, or at least played part along with the Panhandle district in bringing a price reduction last November.

Then, as now, was a period of adding to stocks of crude oil. The difference in the periods is that there is more oil to go into storage now than then, for declines that have occurred in the Panhandle and in some other fields have been far less than the gain at Seminole.

On the other hand, there is not right now any distress at Seminole. There never has been, in the sense of crude oil being available for less than the posted market. Production is controlled by major companies and other substantial operators and no crude oil is to be had otherwise than through the recognized purchasing and pipe line agencies.

FURTHER, as is shown in an accompanying table, pipe line capacity out of the field at present exceeds by only a small margin the daily production. At the recent rate of increase in daily output, that margin will not long suffice but back of that pipe line capacity is a large amount of completed tankage. Stocks in the field are under a half million barrels while there is upward of one and one-half million barrels room in tanks already in, nearly two million more in tanks now being erected and proposed, the latter being in the stage of tank grades, material ordered, etc. Pipe line work now under way will increase the capacity of outgoing lines to nearly 300,000 barrels daily.

The significance of this report on facilities for handling is that there is no immediate likelihood of another semi-shutdown going into effect. The former one was not particularly satisfactory to anyone.

The umpire did a good job and he was decently supported by the opera-

We're In the Movies Now!

CLEVELAND, Feb 7.—Yes, sir! We're in the movies now!

If anyone who saw "The Potters", a recent Paramount release, failed to see the copy of National Petroleum News which was frequently referred to in the picture, he was like Love—he was blind.

It was National Petroleum News' initial and triumphant bow to motion picture audiences, and judging from comments which have already reached it from oil men the country over, it made quite an impression. None other than W. C. Fields, famous veteran of many stage and screen successes, was the one who, frequently turned to the pages of National Petroleum News.

He was doing just that when the camera caught him in the comfortable pose in which you see him on the cover of this issue.

tors, but any company sitting in the middle of a major play like Seminole, with high potential production, various kinds of contractual obligations to be met and the well defined feeling that the way to get the most oil is to get it in a hurry, likes nothing quite so well as to see them "turning 'round." Hence, there was a sigh of relief when it was found that the lid could be lifted altogether.

To many in the oil industry, the writers are aware, continued development of an area such as Seminole in the face of the possibility of an undreamed of peak of production and a shattered market appears to be wanton selfishness and even sheer foolishness.

TO the owner of a lease in such an area, however, there is scarcely an alternative, where the property has been proved productive. The stimulus to development is in the obligations assumed in the lease contract. Then, too, except in the case of physical waste, there is that dangerous zone of conflict with federal law if preservation of a price structure is the motive back of an agreement.

In this discussion, the term Seminole district is used for the area that consists of four separate pools. They are not joined at this time, but neither are they defined and within the district almost anything may happen. New pools may be found that are not now known and one or more of the present pools may be joined.

The fact that the Seminole City, Searight, Earlsboro and "8-6" pools have about the same water level—minus 3300 feet—indicates that they are all on the same broad structure and drilling has established that "highs" or anticlines imposed upon the large structural feature are the areas of oil accumulation, with sags or saddles here and there, carrying water or yielding relatively small wells.

The main uplift or arch is, in effect, a structural foothill of the Arbuckle mountains. Coming from that mountain range the northward slope is interrupted by a sag near the town of Ada, picks up again and continues its north dip to somewhere in the southern part of Lincoln county, where the formations again begin to rise with the influence of the Arbuckles lost and that of the Ozark uplift in effect.

At this time, we find, geologists who follow closely the drilling in this area, are unwilling to make any predictions as to the size of Seminole City, Earlsboro, Searight or "8-6" pools. They prefer, or some of them do, to outline a district in which any number of pools may prove up but beyond the boundaries of which district the chances are small for production that properly can be classed as part of the Seminole area.

The dry holes that appear to mark the borders of the Seminole district are as follows:

Tidal Oil Co. in 3-8-4.; McCulloch Oil Co. in 25-10-4; Sikes et al in 26-11-4; Jarvis & Holm in 4-10-6; Sinclair Oil & Gas Co. in 17-9-7; Carter Oil Co. in 10-8-7; Magnolia Petroleum Co. in 28-8-7; Indian Territory Illuminating Oil Co. in 26-8-6 and Superior Oil Corp. in 31-8-6.

Pipe Lines Serving the Seminole District

Company	Size of Lines	Capacity
Consolidated	1-4 inch	3,000
Gulf	1-8 inch	
	1-4 inch	30,000
Independent	2-4 inch	8,000
Magnolia	2-6 inch	16,000
Oklahoma P. L.	2-6 inch	
	2-4 inch	
	2-8 inch	55,000
Mid-Continent	1-6 inch	8,000
Ozark P. L.	1-4 inch	
	1-6 inch	15,000
Shaffer	1-4 inch	9,000
Sinclair	2-4 inch	
	1-4 & 6 inch	30,000
Tidal	1-4 inch	5,000
Prairie	2-6 inch	
	1-8 inch	45,000
Barnsdall	1-6 inch	10,000
Empire	1-6 inch	10,000
Texas	2-4 inch	16,000
Total Capacity		260,000

Oklahoma Pipe Line Co. is adding to its capacity and Sinclair is increasing, the two additions will bring total pipe line capacity out of the field to around 290,000 barrels daily.

Oil in Storage, Seminole District, Feb. 3

Carter	34- 9-6	110,000
Barnsdall	34- 9-6	
	24- 9-6	40,000
Prairie	27- 9-6	
	33-10-6	200,000
Pure	26- 9-6	50,000
Tidal	25- 9-6	10,000
Total		410,000

OF course, a dry hole in the Seminole district does not prove a great deal—several have been drilled without condemning much more than the diameter of the hole, as sand conditions in the district play an important part in the productivity of wells—but the wells listed are so much lower structurally than the producing district as to make it appear that they serve as outer limits of the district. Other pools, of course, will be found beyond the deep troughs indicated by these wells.

Production in the Seminole district has been called Wilcox sand production since the discovery well to the deep formation was drilled, but geologists for interested companies are in general agreement that it is not the true Wilcox. They refer to it as the post-Wilcox, or Simpson formation. This horizon, more than 100 feet thick, is more a sandy phase of a lime formation, with shales occurring with no uniformity from well to well and occasional streaks of dolomite.

BELOW the Simpson there is a true sand that has been found in some wells and this bears the earmarks of being the true Wilcox. The evidence of oil in this lower sand is almost wholly lacking; one well was thought to have found production in it, but there was nothing positive about it and anyway there has been quite enough to worry about without speculating on the chances for deeper production.

Few fields have been found in the Mid-Continent which have been so difficult of interpretation from a sub-surface standpoint. In Searight, for example, contour lines—lines which connect points of equal elevation—which are based upon below surface horizons, wind in and out in most irregular manner and any attempt to project a line from a known point to one that is unknown, which is possible in fields where dips are regular, is rather an idle occupation in the Seminole district. An undulating, wavy top to the producing formation characterizes the two fields that have had extensive drilling—Seminole City and Searight.

It would be expected that such irregularity would make for inconsistencies in well performance and this has been the history of the Seminole City

Index To Coming Meetings

Michigan Independent Oil Men's Association, Detroit, Feb. 10, 11.

Georgia—Alabama Independent Oil Marketers Association, Ansley Hotel, Atlanta, Ga., Feb. 11, 12.

American Institute of Mining & Metallurgical Engineers, Engineering Societies Bldg., New York City, Feb. 14, 15, 16, 17.

Illinois Petroleum Marketers' Association, Hotel Abraham Lincoln, Springfield, Ill., Feb. 16, 17.

Ohio Petroleum Marketers Association, Neil House, Columbus, O., Feb. 17, 18.

Ohio Gas & Oil Men's Association, Elks Home, Columbus, O., Mar. 1, 2.

Western Petroleum Refiners Association, Muehlbach Hotel, Kansas City, Mo., Mar. 3.

Minnesota Petroleum Association, Hotel Radisson, Minneapolis, Mar. 3, 4.

National Petroleum Marketers Association, Congress Hotel, March 8, 9, 10.

American Association of Petroleum Geologists, Tulsa, Okla., Mar. 24, 25, 26.

American Oil Burner Association, Broadway Auditorium, Buffalo, N. Y., Apr. 5, 6, 7.

Petroleum Division American Chemical Society, Richmond, Va., Apr. 11, 12, 13, 14.

American Oil Men's Association, Congress Hotel, Chicago, Apr. 12, 13, 14.

National Petroleum Association, Riverside hotel, Cambridge Springs, Pa., April 28, 29.

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National Petroleum News is copyrighted, 1927, by the National Petroleum Publishing Co. Single copies, 10 cents. Subscription rate $3.50 per year in the United States and Mexico (U. S. Money), $4.00 in Canada and $5.00 in all foreign countries. Trademark registered U. S. Patent Office. Members of Audit Bureau of Circulations and Associated Business Papers, Inc.

Published at MAIN OFFICE Cleveland, Ohio
812 Huron Road

LOS ANGELES Petroleum Securities Building
TULSA World Bldg.
NEW YORK 342 Madison Ave.
HOUSTON 608 West Bldg.
CHICAGO 360 North Michigan Ave.

and Searight pools. As for Earlsboro and "8-6", or the Lima pool, as some companies style the latter area, their history is confined to one and two wells and for that reason there is no basis for drawing conclusions, either as to productivity or structure, except to say that the producing wells have been of steady and large yield.

UNLESS one arbitrarily assigns some number of acres to each producing well, such as 10 acres which is a favorite figure where a field is undefined, it is impossible to say what is proven territory in the Seminole district. In Earlsboro, no calculation on this basis is possible unless we say that the Gypsy's discovery well proved 10 acres, a patent absurdity. In the "8-6" pool, the two producing wells, both owned by the I. T. I. O. are about one and one-half miles apart. What intervenes is unknown.

In the Seminole City pool, three anticlines on the major arch of the area are known. The apex of one appears to be in the northwest corner of Sec. 35-9-6. Another is traceable from the northeast corner of Sec. 35, extends through the southeast corner of Sec. 26 and northwest including the original Independent well, thence northwest to the Tidal's Fixico lease. A third folding covers nearly all of the southwest quarter of Sec. 24, is a large, flat feature and extends northwest into the northwest of Sec. 23.

The Seminole City pool is outlined on the east side by dry holes and small wells but is not outlined on the west. There is a dry hole on the southwest edge. Apparently, considerable territory on the west will be "in the money." Also, apparently, Seminole City and Searight will not be connected. There prediction ends.

From consideration of all the factors in present development, the final peak of production may be some distance away. The season is against immediate attainment of the final high mark. No one who has not seen the present tangle down there can visualize it. The traffic congestion is equal to any on the Western Front in France during the war. Motorized hauling has broken down completely and the horse and his half-brother have returned to their former high favor.

ALL this delay in transportation will have its effect on the rate of well completion. Wells that are down to striking distance of the pay, say to 3700 or 3800 feet, in many cases have the pipe at the location for completion of the well and are ready to go ahead without interruption other than the usual delays, provided the cable tools for drilling-in are near enough.

If the cable string has to be brought from a remote location, it may make a

Principal Producing Companies, Seminole Field, as of Feb. 1, 1927

Company	No. Wells	Production Feb. 1
Carter Oil Co.	29	35,850
I. T. I. O. Co.	22	22,750
Pure Oil Co.	11	22,151
Sinclair*	12	20,915
Prairie O. & G.	14	17,690
Tidal Oil Co.	17	17,250
Amerada Corp.	13	14,233
Mid-Cont. Pet.	13	14,230
Gypsy Oil Co.	25	12,910
Barnsdall Oil Co.	8	12,823

*Includes partnership lease with Transcontinental Oil Co.

Tankage in the Seminole District

Company	Tankage Completed Location of Tanks	No.	Size
Amerada	7- 9-6	2	55,000
Barnsdall	24- 9-6	2	55,000
Barnsdall	34- 9-6	1	55,000
Carter	35- 9-6	2	55,000
Carter	34- 9-6	1	55,000
Carter	3- 9-6	1	55,000
Mid-Continent	14- 9-6	2	55,000
Mid-Continent	34-10-6	1	55,000
Gulf	35- 9-6	1	55,000
I. T. I. O.	24- 9-6	1	55,000
I. T. I. O.	26- 9-6	2	55,000
Pure	26- 9-6	2	55,000
Pure	28- 9-6	2	55,000
Sinclair	3- 8-6	2	80,000
Sinclair	3- 8-6	1	55,000
Sinclair	35- 9-6	1	55,000
Slick	6- 8-7	1	55,000
Tidal	25- 9-6	3	80,000
Oklahoma P. L.	35- 9-6	2	55,000
Prairie		4	55,000
		34	1,995,000

Tankage Building

		No.	Size
Amerada	7- 9-6	2	55,000
Barnsdall	34- 9-6	1	55,000
Carter	35- 9-6	3	55,000
Carter	3- 9-6	2	55,000
Mid-Continent	14- 9-6	1	55,000
I. T. I. O.	24- 9-6	2	55,000
Pure	28- 9-6	7	55,000
Prairie	27- 9-6	2	55,000
Slick	6- 8-7	1	80,000
		21	1,180,000

Grading and Locations Made

		No.	Size
Carter	34- 9-6	3	55,000
Empire	35- 9-6	1	55,000
Searight	33-10-6	1	55,000
Sinclair	3- 8-6	2	80,000
Slick	6- 8-7	2	80,000
Prairie	27- 9-6 33-10-6	6	55,000
Pure	28- 9-6	1	55,000
Totals:		16	980,000
Complete		34	1,995,000
Building		21	1,180,000
Grading, etc.		16	980,000
Grand Total		71	4,155,000

Seminole, Searight, 8-6, as of Feb. 1

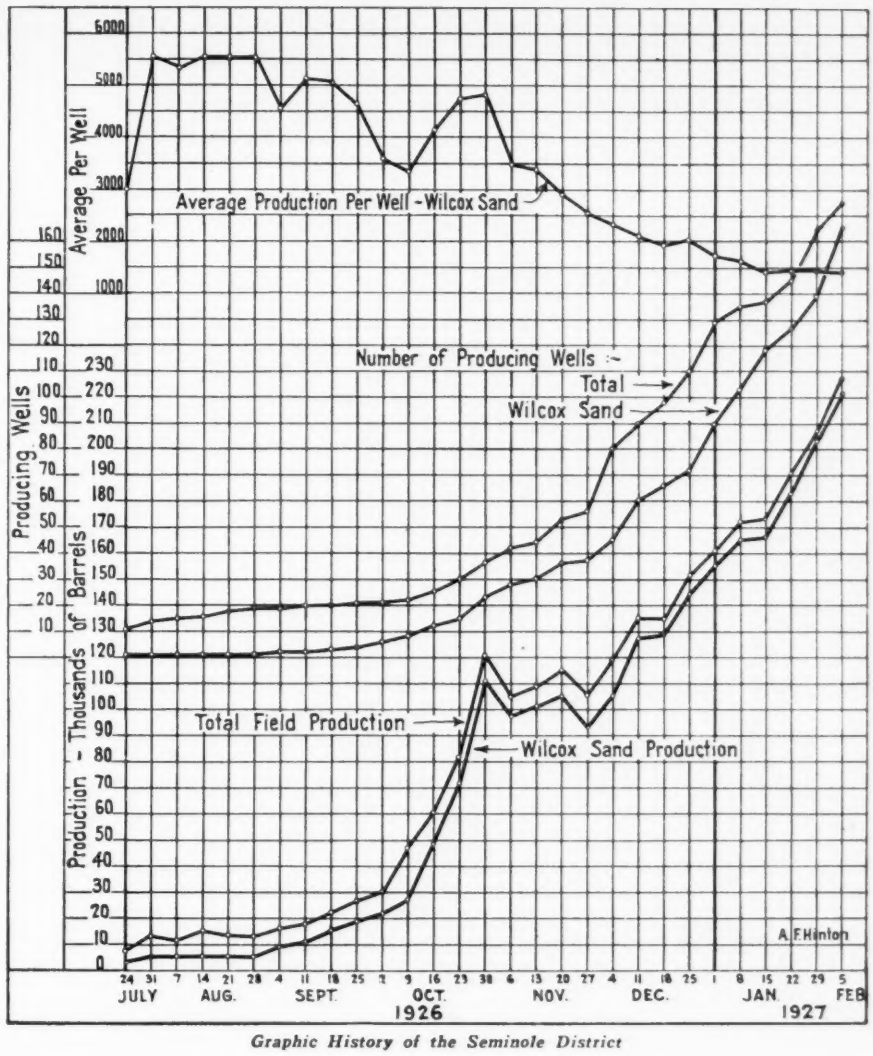
Company	Farm	S.-T.-R.	Prod. Wells	Prod. Feb. 1	Total Recovery to Feb. 1
Atlantic	Cudjo	35- 9-6	1	1,015	5,735
Amerada	Fixico	23- 9-6	4	7,310	775,025
Amerada	James	24- 9-6	1	0	661
Amerada	Killingsworth	23- 9-6	4	2,353	366,487
Amerada	Rentie	23- 9-6	4	4,570	132,422
Barnsdall	Jones	34- 9-6	1	5,561	25,212
Barnsdall	Carter	24- 9-6	7	7,262	766,633
Carter	B. Carter	24- 9-6	2	165	94,926
Carter	F. Carter	23- 9-6	4	2,975	194,755
Carter	J. Carter	24- 9-6	4	430	137,643
Carter	Davis	4- 9-6	1	2,620	80,971
Carter	Frazier	3- 9-6	1	3,215	250,434
Carter	Grisso	23- 9-6	4	6,170	221,192
Carter	M. Killingsworth	23- 9-6	2	2,150	105,067
Carter	Knapp	13- 9-6	3	1,220	13,816
Carter	Lukes	27- 9-6	2	3,380	105,586
Carter	Rentie	14- 9-6	3	3,275	29,165
Carter	T. Stewart	34-10-6	2	4,935	427,524
Carter	Strothers	34- 9-6	1	4,200	75,848
Carter	Cudjo	35- 9-6	1	0	195
Empire	Wilson	34- 9-6	1	920	11,147
Gypsy	Carter	24- 9-6	8	5,230	308,196
Gypsy	Cudjo	4- 9-6	1	0	1,163
Gypsy	Fixico	26- 9-6	8	498	139,378
Gypsy	Harjo	25- 9-6	1	640	11,255
Gypsy	Wolfe	26- 9-6	5	6,030	616,556
Gypsy	Butler	35- 9-6	2	520	2,386
Independent	P. Fixico	23- 9-6	2	460	871
Indept-Garland	Fixico	26- 9-6	7	5,173	1,475,654
Indept-Interocean	Jones	26- 9-6	3	5,945	322,407
I. T. I.	Bowlegs	26- 9-6	5	5,879	803,736
I. T. I.	Goodin	23- 9-6	4	348	12,304
I. T. I.	Harjo	23- 9-6	4	2,523	68,435
I. T. I.	James	24- 9-6	4	2,579	436,731
I. T. I.	Livingston	15- 8-6	1	6,530	155,526
I. T. I.	Davis	13- 8-6	1	4,843	161,652
I. T. I.	Reed	24- 9-6	3	48	26,951
Magnolia	Franks	25- 9-6	1	3,056	92,651
Mid-Cont.	Grayson	34-10-6	3	7,150	521,377
Mid-Cont.	Rentie	14- 9-6	5	3,400	404,691
Mid-Cont.	Tayoche	24- 9-6	5	3,680	632,573
Mid-Kansas	Wilkins	25- 9-6	1	0	85
Prairie	J. Carter	10- 9-6	1	225	20,386
Prairie	Gross	25- 9-6	4	355	22,503
Prairie	Kinkade	33-10-6	5	10,605	759,973
Prairie	Spencer	13- 9-6	1	0	2,097
Prairie	Strothers	27- 9-6	3	6,505	449,647
Philmack	Butler	35- 9-6	1	2,405	29,495
Pure Oil	Strothers	26- 9-6	11	22,151	1,277,620
Searight	Youngblood	33-10-6	3	1,072	494,674
Sinclair	J. Carter	13- 9-6	2	90	34,938
Sinclair	Cudjo "A"	35- 9-6	5	10,205	427,628
Sinclair	Cudjo "B"	35- 9-6	3	6,105	437,389
Sinclair & Transcont.	Fixico	23- 9-6	2	4,515	167,761
T. B. Slick	Franks	35- 9-6	4	9,881	519,803
Superior	Cudjo	35- 9-6	3	5,257	512,820
Tidal	J. Carter	24- 9-6	2	1,805	120,855
Tidal	Fixico	26- 9-6	5	9,760	633,805
Tidal	Harjo	23- 9-6	3	400	11,891
Tidal	Mahardy	24- 9-6	4	2,695	821,514
Tidal	Tayoche	25- 9-6	2	2,590	122,802
Turman	Cudjo	35- 9-6	1	0	3,032
Total Seminole			192	224,879	16,785,655
	EARLSBORO				
Earlsboro Sand			10	1,100	178,340
Wilcox Sand			1	8,152	570,000
Total Earlsboro			11	9,252	748,340
Grand Total			203	234,131	17,533,995

difference of several days. In ordinary times, with dry ground and good trucking conditions, it would be possible to say with some authority what would be an average number of completions each week, but not so at present. Wells now starting, with little material landed at the location, will be tedious in progress.

In the 202 days since the Independent Oil & Gas Co. got the first Wilcox sand oil in the field last July, the Seminole area, including Searight and "8-6", but not including Earlsboro, had produced 16,785,655 barrels of crude to Feb. 1. This is an average for the whole period of 83,097 barrels daily.

Taking the district as a whole, it is reasonable to assign 10 acres to each producing well as a basis for finding the approximate yield per acre. Using this method, 192 wells (including those producing from the Hunton lime) or 1,920 acres, divided into total recovery shown above, indicates a per-acre yield of 8,742 barrels. There are about 20 Hunton lime wells, producing between 4,000 and 5,000 barrels daily.

PER-ACRE yields on certain properties naturally are much higher than the average given above, running as high as 20,000 barrels in a few instances, and taking into consideration only the 10 acres around each well, rather than actual acreage of the property on which the wells are located. One such property is the northeast 40 acres of the Pure Oil Co's. Strothers lease, one of two properties in the field that have produced more than one million barrels of oil to date. This lease consists of 160 acres, but is not all drilled up and apparently its richest part is the northeast quarter.



Graphic History of the Seminole District

Another lease that has shown high yield per acre is the Tolof Fixico farm, owned half by the Independent Oil & Gas Co. and half by R. F. Garland. This lease, on which the Wilcox sand was discovered, consists of 80 acres and has eight wells, or one well to 10 acres. It had been producing 202 days Feb. 1, and its total recovery to that time was 1,475,654 barrels. Its average for the whole period was 7,305 barrels per day and its yield per acre has been 18,446 barrels. Its highest production was reached Oct. 14, 1926, when it made 18,568 barrels, from four wells.

SEMINOLE, Searight and "8-6" although future developments probably will prove them to be separate pools, are generally considered one field for the purpose of estimating production, as they are close together and are on the same general geological structure. Earlsboro, however, is about six miles from Seminole, and has always been considered as a separate field. This field was discovered in March, 1926, when Morgan & Flynn drilled in a well in what has since been known as the Earlsboro sand. These operators sold out to the Magnolia Petroleum Co.

The Wilcox sand was discovered by the Gypsy Oil Co., on a state-land lease owned jointly by it, Amerada Petroleum Corp., and Westland Oil Corp. This well made its first oil late in Oc-

Seminole, Wells Showing Water, Feb. 1, 1927

Company	Farm Name	S T R	Well No.	No. Bbls. Oil	No. Bbls. Water	Prod. From	T. D.
Amerada	Killingsworth	23- 9-6	1	220	185	Wilcox	4145
Amerada	Rentie	23- 9-6	2	1085	95	Wilcox	4162½
Barnsdall	Carter	24- 9-6	1	360	18	Hunton	3840
Barnsdall	Carter	24- 9-6	4	1110	44	Wilcox	4140
Carter	B. Carter	24- 9-6	2	175	14	Wilcox	4175
Carter	F. Carter	23- 9-6	3	475	38	Wilcox	4103
Carter	J. Carter	24- 9-6	1	50	10	Wilcox	4156
Carter	J. Carter	24- 9-6	2	100	60	Wilcox	4199
Carter	Stewart	34-10-6	1	50% Water from Hunton Approx. 75 bbls.			
Gypsy	Fixico	26- 9-6	1	1800' WIH 1800'		Wilcox	4161
Gypsy	Fixico	26- 9-6	2	7	3%	Wilcox	4223
Gypsy	Fixico	26- 9-6	3	None	HFW	Wilcox	4205
Gypsy	Fixico	26- 9-6	4	None	500'	Wilcox	4152
Gypsy	Fixico	26- 9-6	5	150	500'	Wilcox	4212
Gypsy	Fixico	26- 9-6	7	None	100'	Wilcox	4167
Gypsy	Fixico	26- 9-6	8	67	600'	Wilcox	4171
Gypsy	Wolfe	26- 9-6	3	72	1000'	Wilcox	4170
Gypsy	Harjo	25- 9-6	1	467	Exhausted	Wilcox	4223
Gypsy	Carter	24- 9-6	2	185	500'	Wilcox	4179
Gypsy	Carter	24- 9-6	3	85	5	Hunton	4085
Gypsy	Carter	24- 9-6	5	210	2	Hunton	4008
Gypsy	Frazee	36- 9-6	1	None	HFW	Wilcox	4380
Gypsy	Cudjo	4- 9-6	1	130	5	Hunton	4268
Gypsy	Grayson	33-10-6	1	None	HFW	Hunton	4403
Indep-Garland	Fixico	26- 9-6	3	500 No wat. 2% BS		Wilcox	4083
Independent	P. Fixico	23- 9-6	2	240	10	Wilcox	4167
I. T. I. O.	James	24- 9-6	1	None	HFW	Wilcox	4200
I. T. I. O.	James	24- 9-6	2	None	HFW	Wilcox PB to Hunton	
I. T. I. O.	James	24- 9-6	8	86	35	Wilcox	4204
I. T. I. O.	Goodin	24- 9-6	1	240	72	Wilcox	4182
Mid-Continent	Tayeche	24- 9-6	3	1490	149	Wilcox	4207
Prairie	Gross	25- 9-6	1	50	10	Hunton	4297
Prairie	Spencer	13- 9-6	1	30	5	Hunton	4223 PB To Hunton 4070
Prairie	Kinkade	33-10-6	2	1500	150	Wilcox	4355
Prairie	Kinkade	33-10-6	7	1050	10	Hunton	4210
Tidal Osage	Carter	24- 9-6	1	930	1½%	Wilcox	4132
Tidal Osage	Carter	24- 9-6	4	890	1½%	Hunton	3919
Tidal Osage	Mahardy	24- 9-6	1	2870	30%	Wilcox	4169
Tidal Osage	Mahardy	24- 9-6	2		20%	Wilcox	4192
Tidal Osage	Mahardy	24- 9-6	4		15%	Wilcox	3950

History of Tolof Fixico Lease of Independent Oil & Gas Co. and R. F. Garland, S½ NE of 26-9-6, Seminole Field, Okla. Well No. 1 on this lease discovered the Wilcox sand July 17, 1926.

Month	Daily Prod.	Remarks
July		
17	980	
18	0	
19	1,005	
20	988	
21	2,150	
22	2,806	
23	3,137	
24	3,050	
25	3,084	
26	3,050	
27	3,128	
28	3,082	
29	2,972	
30	4,552	
31	5,680	
August		
1	5,574	
2	5,590	
3	5,546	
4	5,427	
5	5,632	
6	5,583	
7	5,424	
8	5,359	
9	5,474	
10	5,626	
11	5,440	
12	5,444	
13	5,524	
14	5,263	
15	5,557	
16	5,418	
17	5,527	
18	5,581	
19	5,422	
20	5,543	
21	5,590	
22	5,541	
23	5,489	
24	5,438	
25	5,457	
26	5,465	
27	5,463	
28	5,560	
29	5,567	
30	5,472	
31	5,444	
September		
1	5,584	
2	5,434	
3	5,513	
4	5,484	
5	5,484	
6	5,420	
7	5,485	
8	5,378	
9	5,363	
10	7,092	Cleaned Out 6' of Cavings
11	7,783	
12	7,679	
13	7,581	
14	7,677	
15	7,565	
16	7,726	
17	8,012	
18	7,870	
19	7,835	
20	7,747	
21	7,850	
22	7,809	
23	7,812	
24	7,732	
25	7,735	
26	7,747	
27	11,290	#2 completed 3,645 b.
28	11,952	
29	12,026	
30	12,149	
October		
1	12,031	
2	12,045	
3	11,832	
4	12,924	
5	12,973	
6	13,294	
7	13,082	
8	13,080	
9	15,607	#3 completed 5,400 bbls.
10	15,929	
11	16,066	#1 7,082 bbls. #2-3 8,984 bbls.
12	16,044	
13	15,966	
14	18,568	#4 completed 4,992 bbls.
15	18,170	
16	18,367	
17	17,830	
18	17,680	
19	16,919	
20	16,686	
21	17,346	
22	17,240	
23	17,145	
24	15,987	1,300 b. on ground
25	10,447	6,000 b. on ground
26	13,929	1,800 b. on ground
27	13,850	
28	11,089	4,000 b. in dikes
29	13,921	1,000 b. in dikes
30	13,493	550 b. in dikes
31	5,212	8,500 b. in dikes
November		
1	4,917	6,800 b. on ground
2	10,601	1,800 b. on ground
3	11,130	
4	11,256	
5	9,526	1,500 b. on ground
6	11,462	75 b. on ground
7	10,481	
8	11,590	
9	11,559	
10	10,848	
11	10,252	
12	10,024	
13	9,916	
14	6,444	3,000 b. on ground
15	9,862	1,500 b. on ground
16	7,850	#4 pinched in
17	7,766	
18	7,132	
19	7,499	
20	8,399	#3 flow by heads
21	7,185	400 b. on ground
22	7,012	
23	6,812	
24	6,276	
25	5,885	
26	5,585	#1-2 swabbing
27	5,396	
28	5,928	
29	4,794	
30	5,309	
December		
1	5,774	
2	5,100	
3	2,949	#4 dead
4	3,821	
5	3,478	
6	3,880	#2-4 on gas
7	3,827	
8	4,110	
9	4,886	
10	5,661	#5 completed 4,800 bbls.
11	5,525	
12	3,816	#4 down
13	2,313	
14	8,225	
15	4,697	
16	4,795	#6 completed 1,890 bbls.
17	5,850	
18	4,814	
19	3,955	
20	4,587	
21	4,370	
22	4,225	
23	5,290	
24	4,717	
25	5,065	
26	3,805	
27	4,114	
28	5,091	
29	5,030	
30	6,427	
31	5,804	
January		
1	5,584	
2	5,446	
3	5,536	
4	6,153	
5	7,128	
6	6,391	
7	6,042	
8	5,681	
9	5,793	
10	5,664	
11	6,549	
12	6,743	#8 completed 200 bbls.
13	6,246	
14	5,537	
15	5,455	
16	5,729	
17	4,129	
18	5,900	
19	5,724	
20	4,613	
21	6,022	
22	6,540	
23	5,385	
24	6,088	
25	4,750	
26	4,164	
27	5,394	
28	6,114	
29	5,194	
30	5,896	
31	6,092	
February		
1	5,129	#7 completed est. 300 bbls.
2	5,231	
3	3,418	
202	1,475,654 Barrels	
Total 202 days		
Average per day 7,305 barrels.		
Yield per acre (80 acres) 18,446 bbls.		

tober and has averaged about 8,000 barrels a day since drilled in. At present, there are 10 Earlsboro sand wells producing 1,100 barrels daily and the one Wilcox well, which was making 8,152 barrels Feb. 1.

Total recovery from this field to Feb. 1 was 748,340 barrels, of which the Wilcox sand well had produced 570,000 barrels. The discovery well was completed early in November and a large number of wells immediately started up. As an indication of the difficulties that have attended field operations in the district, 90 days have elapsed without the completion of another Wilcox sand well. However, seven wells are drilling below 3,700 feet and at least two are on top of the sand.

Use of gas-lift as artificial stimulation undoubtedly has been instrumental in keeping Seminole's production up, as many wells which would otherwise be dead, or which at best would be produced by the expensive swabbing method, are now flowing on high-pressure gas. As far as can be learned, about 50 wells are now on gas in the field. This number will be greatly increased as soon as the companies find it possible to move machinery into the field, and as soon as the present compressor shortage has been relieved.

As for water encroachment, the situation is not serious at present. What water is present in wells is confined either to edge wells with reference to the field as a whole or to wells located in the deep trough or syncline in the north portion of section 26-9-6 and adjacent territory. The water situation in the field as of Feb. 1 is shown in a table accompanying this article. It shows that there were then 40 wells making some water, of which seven were dry holes and had only small showings, or no oil at all, in the Wilcox sand. Seven others are Hunton lime wells and have little bearing on the Wilcox sand water situation.

Seminole offers the first instance, at least in the Mid-Continent, of the immediate use of gas-lift on new wells in what would ordinarily be considered a flush field. The second crop of wells, following all the big 8,000- and 10,000-barrel wells drilled in last fall, have shown a decided disinclination to flow naturally. They are swabbed at first, but as a general thing, the company will put the well on gas-lift as soon as possible after finding that it will not flow naturally.

Carter Oil Co., which got a late start in its Seminole drilling operations, is now far in the lead among principal producing companies in the field, with about 36,000 barrels daily production. Indian Territory Illuminating Oil Co., original discoverer of Hunton lime production at Seminole last March, has 22,750 barrels daily production, from 22 wells. Pure Oil Co., which has only one producing lease is not far behind, with 22,151 Bbls. daily from 11 wells.

BULLETIN
(By Wire)

TULSA, Feb. 7.—Amerada Petroleum Corp. has brought in second Wilcox sand well in Earlsboro field, Seminole district. This well, No. 2 Anderson in southwest corner NW NW of 15-9-5, is in sand from 4260 to 4272 feet and flowed 9600 in last 24 hours. Wilcox sand discovery well of Gypsy Amerada and Westland, now 90 days old, made 7625 barrels. Amerada well found formations practically level compared with Gypsy well. As result of this well and numerous completions at Seminole, production of four fields comprising the district totaled 279,840 barrels in last 24 hours, an increase of nearly 40,000 barrels since last Friday. Seminole proper produced 222,212 barrels; Searight 29,671; Earlsboro 17,514. In township 86 (I T I O) Indian Territory Illuminating Co.'s Livingston well section 15 is making 6350 barrels and its Davis well in section 13 is making around 4000 and cutting three per cent. Seminole district production is now in excess of present pipe line facilities not including that under construction.

Iowa Jobbers Discuss Cooperative Oil Companies Formed by Farmers

Staff Special

DES MOINES, IA., Feb. 7

THE Farm Bureau Cooperative oil companies were discussed at the annual meeting of the Iowa Independent Oil Men's Association which closed here today.

A report on a new oil cooperative, which is being organized in Blackhawk county, Iowa, was made. It is considered the forerunner of many such companies, the result of a determined campaign to establish them all through the west being put on by E. G. Cort. Mr. Cort is manager of 43 such companies in Minnesota.

At the Iowa meeting, probably the largest in its history, with nearly 300 in attendance, discussion on this subject became lengthy.

Both sides were represented, as there were representatives present of two cooperative companies already operating in Iowa.

WHILE the oil men expressed sympathy for the situation of the farmer, and, to quote A. L. Lommel, president of Bartles-Shepherd Oil Co. of Waterloo, Ia. and president of the association, "the jobbers are not considering the farm bureau situation from a standpoint antagonistic to the farmer," nevertheless the feeling of members was that farmers' cooperative oil companies, as generally operated, are decidedly detrimental to the interests of private capital invested in the oil industry as well as in all business.

One speaker pointed out that if the cooperative idea were carried out to its last analysis it would mean that the farmer would buy not only his oil but everything else through cooperative organizations which would be so big that their headquarters would of necessity be in the large cities where direct contact could be had with manufacturers of their supplies and equipment. This, he said, would literally destroy towns in farming communities and in destroying them would remove a tremendous amount of property from tax duplicates so that city property and corporations who are now paying the bulk of the taxes in farming communities would be eliminated entirely, and only the farm property be left to carry the load of government.

One speaker said that almost any type of organization that could serve better than the existing types, would live but that cooperative organizations seldom, if ever, had the necessary efficiency of management and economy of operation to render such service; that it was not possible, because of the cooperative nature of the organization, for them to have the same type of efficiency as the private enterprise when the individual had his own money and his own life at stake in the efficient development of his business.

IT was suggested that these farm cooperative oil companies could be used to illustrate to the business interests of the western states the unfairness of the cooperative idea whether represented by farmers or by state or municipalities entering private business. Business men in western states in recent years cheered loudly when states and cities entered the oil business, not appreciating that this was an uneconomic invasion in a field wherein private capital and individual initiative has shone. None of these men seem to appreciate that the state might next day be competing with his business.

This latest cooperative will have headquarters at Waterloo, Ia., and do a wholesale and retail business. It will solicit business from the public and also from those business men from whom the farmer buys.

Here, one speaker pointed out the inherent evil of the cooperative idea; that it uses coercion to exist; that in the majority of cases at least, they could not obtain business from other merchants and manufacturers, on an equal basis; that they only obtain it by threats of withdrawing patronage.

This new Blackhawk county company had its first meeting Jan. 1 at Waterloo. Two thousand shares at $10 per share value will be issued. Only two shares will be sold to each member. It was expected that at least 500 of the 600 farmer members in that county will eventually subscribe.

Only such share holders as are active farmers, in the opinion of the board of directors, can vote. The board is given authority to cancel membership when a member moves out of the county or out of active farming.

One thousand and fifty dollars worth of stock was subscribed for at the meeting, of which $950 was paid in in cash.

A RETURN of 8 per cent is promised on the stock and after 10 per cent of the investment has been set aside for a sinking fund the balance of the net income, if any, is to be returned to farmer members only, prorated on their purchases of petroleum products.

While the public and merchants and manufacturers will be solicited vigorously for business, there will be no rebate to them.

Mr. Cort, who is general manager for the 43 Minnesota companies, spoke at this Waterloo organization meeting. He is to buy petroleum products for this new company as he does for the Minnesota companies and also will buy all the equipment, on a brokerage basis.

Mr. Cort reported that the Minnesota companies are extremely successful financially, although many of the members of the Iowa jobbers at Des Moines meeting disputed that statement.

Mr. Cort reported that a mutual company at Albert Lea with $20,000 invested last year rebated $28,000; that the Steele county company rebated $27,000. He said the lowest rebate was 9 per cent and the highest 16 per cent on investment after 8 per cent had been set aside for interest and 10 per cent for sinking fund. Nothing was said by Mr. Cort on losses, evaporation, etc. He did observe that, "if necessary" a manager could be hired for this new company at $125.00 per month.

One of the results of this type of competition is shown at Sioux City, Ia., where the gasoline tank wagon price has been 11.9 cents since last June.

AFTER hearing the details of this new cooperative the Iowa jobbers at this Des Moines meeting called in Mr. Murray of the Prairie Oil Co. He is manager of the farmers' oil company and had sold shares at $10 which are now selling at $15. They prorated profits to members but he does not consider that he is in competition with regular oil companies. They sell to members and where they sell to the public it is at posted prices.

William J. Wylie, Farmers' Union Oil Co. of Boone, Ia., made a stirring talk on behalf of the farmer and what, in his opinion, was the need and the rights of the farmer, to establish these oil companies and said they were not, in his opinion, disturbing general oil marketing conditions.

The legislative situation in Iowa received considerable attention. H. E. Wormhoudt, general manager of Manhattan Oil Co., Des Moines, chairman of the association's legislative committee, reported on the conferences the committee has had with various state officials and members of the legislature on the gasoline tax.

An effort is being made by some legislators to increase the gasoline tax. The interest of the association is to see that it is not increased too much to the detriment of the public; that tax funds are used for road making and that the oil industry is reasonably compensated for the trouble and expense in collecting the tax.

Something of a bombshell was exploded just at the close of the meeting, after most of the members had left when J. G. Anderson, of the Primary Oil Co., of Charles City, Ia., who said that he is relatively a newcomer to the business, read a bill which he has drawn and which

he claims several members of the Iowa legislature have promised to introduce, which would very definitely place the state in direct supervision of the oil industry.

HE would have all service stations and pumps licensed: that is, the right to do business would be licensed by the state. A fee of $5.00 per station would be paid and this money would be used to employ sufficient inspectors to keep track of the oil business as to compliance with this law.

Under this proposed bill of Anderson's, oil companies would be required to post maximum and minimum prices for each pump. They would also have to post the gravity of the gasoline, initial and end point and the name of the company furnishing the gasoline.

Deviation from this would be a misdemeanor. The state would have authority to close a service station for violation.

Anderson considers this an antidote to the Q. D. A. which he said, had been extended to members of various travelling men's organizations.

The old officers of the association were re-elected as follows:

A. L. Lommel, Waterloo, president; J. F. Conover, Calmar, vice president; H. E. Wormhoudt, Des Moines, second vice president; H. G. Scharfenberg, Fort Dodge, treasurer, and M. L. Long, Des Moines, secretary.

Of the other speakers at the meeting, J. H. Cushman, Des Moines, welcomed the jobbers; Theodore A. Peck, director of engineering of the Independent Oil Men of America, Chicago, who talked on "Fact and Theory of Automobile legislation;" James A. Gilmore, Secretary American Oil Men's Association, Chicago, who told of the work of various state associations from his several years experience as secretary of the Michigan jobbers. L. F. Kuehnle, past-president, was unable to speak on account of illness in his family. L. V. Surtees spoke on the "Manufacture and Use of Cracked Gasoline;" Warren C. Platt, editor of National Petroleum News, spoke on "Gasoline Legislation," and Frank W. Lovejoy, of Vacuum Oil Co., N. Y., on "Merchandising Principles."

A banquet and entertainment were given the first evening of the meeting.

Murray Home from South Joins Bond House

CHICAGO, Feb. 5.—Jack L. Murray, formerly manager of the Corn Belt Oil Co., Bloomington, Ill., and more recently in charge of the industrial relations department of the National Petroleum Marketers Association, 624 S. Michigan Ave., Chicago, has returned from Florida where he spent the first half of the winter. He is with Colvin & Co., a bond house at 39 S. La Salle St.

Mr. Murray expresses great happiness to be in Illinois, within commuting distance from Bloomington, and with climatic conditions in the Great Lakes region trying to be like Monte Carlo is this winter.

Cities Service Western Companies Consolidated; Tulsa Main Office

Staff Special

TULSA, Feb. 7

DETAILS of the reorganization and consolidation of the various division marketing companies of the Cities Service Oil Co., subsidiary of the Empire Refineries, Inc., into one large company which will have its general offices in Tulsa, was announced today in connection with a meeting of the division managers here.

The consolidated company will be known as the Cities Service Oil Co. (of Delaware) and will operate in 14 states and in Canada. W. H. Merritt has been named general manager. Mr. Merritt has been with the Cities Service company for 22 years. He comes here from St. Paul where he was in charge of the division office under the old plan.

Other executive officers here will be C. A. Willis, general sales manager, who formerly was assistant sales manager for the Empire Refineries, Inc., L. E. Hutchins, manager of lubricating oil department, who has been lubricating oil engineer with the Empire Refineries, and H. S. Pettingill, general superintendent in charge of operation, who formerly was assistant manager of the Empire Pipe Line Co. with headquarters at Bartlesville.

General offices will be on the seventh floor of the Tulsa Trust Co. building at Fourth st. and Boulder av. An addition to this building is being erected and the offices will also occupy space in this new structure. The Empire Refineries, Inc., already have general offices in this building.

The Cities Service Oil Co. heretofore has operated primarily as separate units with each division maintaining large division offices, and having its own organization. Under the new plan the division managers will have their offices as usual but the directing operations will be handled primarily from Tulsa. It was deemed advisable in view of the expansion program the company has planned, to centralize the operation in order to gain more efficiency and coordination.

The general office executives will dictate all policies to the divisions which operate in Texas, Arkansas, Oklahoma, Colorado, Kansas, Missouri, Nebraska, Iowa, Illinois, Indiana, Wisconsin, Minnesota, N. Dakota, S. Dakota and Canada. The company will have the marketing branch of the Empire Refineries, Inc., in those states, and will have charge of industrial lubrication sales, but jobber business will be handled by the sales force of the Empire Refineries, Inc., as has been the policy in the past. The other Cities Service marketing companies keep their present status.

This centralization will result in a standardization of station designs, advertising and equipment, officials said, and every effort will be made to build a uniformity of service throughout the states in which the company will operate.

"This new plan will permit us to offer the motoring public uniform products and service everywhere we operate," Mr. Willis said. "We will have lubrication engineers to specialize in industrial lubricating oil business, and assist industrial companies in making surveys to determine the proper lubricants for their needs. The company expects to expand both through the building of more service and bulk stations, and by purchasing businesses already established."

Division managers have been in Tulsa since Tuesday discussing the new work with the executive officers. Meetings were held at the Mayo hotel. Friday those in attendance will visit one of the plants of the Empire Refineries, Inc., at Okmulgee, and Saturday will visit the offices of the parent company, the Empire Gas & Fuel Co. at Bartlesville. A dinner was given last night in honor of the division managers, and a dinner tonight for the managers and friends from the Empire Refineries, Inc.

Division managers in attendance were: C. D. Allenbach of St. Paul, V. B. Day of Chicago, T. B. Hancock of Denver, Hugo Hoevel of Tulsa, Frank Loring of Grand Forks, W. L. Lind of Sioux City, W. A. Riley of Fort Worth, G. S. Speaker of Cedar Rapids, and A. M. Wofford of Toronto.

Others who attended the meetings included P. M. Miskell, H. W. Camp, O. J. Tuttle, A. C. Holmes, and H. G. McLean of the Empire Refineries, Inc., Tulsa; H. D. Freaueaff of New York, H. R. Straight, Floyd Brown, C. C. Murray and D. W. Harris of the Empire Gas & Fuel Co., Bartlesville.

Green Bay Snow Bound. Hastings Goes South

CHICAGO, Feb. 5.—S. D. Hastings, Jr., president of the Barkhausen Oil Co., Green Bay, Wis., his father, S. D. Hastings, Sr., his wife and mother, passed through Chicago Feb. 4, on a motor trip south. The party is headed for New Orleans by way of Memphis with no particular time limit to the excursion. They are making the journey easy.

Mr. Hastings said the oil business in northern Wisconsin is at a standstill, roads being blocked with snow and only a small amount of motoring possible.

NEW YORK.—On Feb. 1 the executive offices of Aqua Oil Service, Inc., were moved to larger quarters to Court Square Bldg., 2 Lafayette St., New York. The company makes the Aqua system for hydraulic storage for gasoline and oil handling.

Standard Sues Bartles-Maguire and Graver; Defendants Ask for Definite Charges

By Paul Truesdell
N. P. N. Staff Writer

CLEVELAND, Feb. 5

THE Bartles Maguire Oil Co. and the Graver Corp., which were jointly sued by the Standard of Indiana on Jan. 12 on the charge of infringing and conspiring to infringe nine of the Burton-Clark-Humphreys-Cash patents on cracking oil, on Jan. 31 filed a motion asking that the plaintiff file a bill of particulars stating clearly and precisely what claims in these patents are being infringed by the defendants and how.

The defendant companies state in their motion that the Standard's petition, filed without notice to them, is likely to create a panic among the defendant's customers and "delude them into supposing (contrary to fact) that they cannot safely deal in or purchase any product of the defendants."

The Standard's petition, the motion goes on to say, "is so indefinite in its charges that it may so prolong the controversy and create during its continuance such apprehension as to wrongfully divert immense patronage from defendants to plaintiff and inflict irreparable damage on defendants even though it should afterward appear that plaintiff has no cause for complaint." A speedy hearing and a reasonably early decision is sought by the defendants so that their business may not be unduly injured.

The Standard's suit, which was filed in the federal district court at Hammond, Ind., asks temporary and permanent injunction against further alleged infringement and damages not exceeding three times the profits made by the defendants by the alleged infringements. Although no process is specifically mentioned, it is presumed that the Bartles Maguire company is made a defendant because it is operating the Jenkins cracking process at its plant at East Chicago and the Graver Corp. because it is the manufacturing and sales agent for the process.

SEVEN of the patents claimed to be infringed and their nature follows:

No. 1,105,961—William M. Burton, applied for Aug. 25, 1913, issued Aug. 4, 1914. This covers Burton's discovery that by running down to coke the 35 or 40 per cent of "pressure tar" left in a cracking still after a run, he could get off about 95 per cent of distillate suitable for cracking and yielding as much pressure gasoline as virgin gas oil.

No. 1,119,496—Edgar M. Clark, applied for April 20, 1914, issued Dec. 1, 1914. This covers Clark's idea of circulating a continuous stream of oil through heating coils in a furnace, from and to a bulk supply of oil contained in an insulated drum not externally heated.

No. 1,119,700—Robert E. Humphreys, applied for Jan. 23, 1915, issued Nov. 16, 1915. This is the patent on the well known "Humphreys run back" that occupied considerable time in the testimony of Robert E. Wilson in the hearing of the government suit against the Patent Club. It consists of a slanting vapor line of large section which dephlegmates the vapors and returns heavy condensate to the cracking still.

No. 1,160,689—William M. Burton, applied for Feb. 20, 1915, issued Jan. 11, 1916. This covers the safety valve for pressure stills which releases the vapors into a 15-foot long pipe extending into the air and which cools the vapors so that they do not flash when they reach the air.

No. 1,167,884—William M. Burton, applied for Dec. 14, 1916, issued June 12, 1917. This is a product patent covering the distillate from the pressure tar which was claimed to be a new product, distinguished from other petroleum products by its low viscosity in relation to gravity. Claimed to be especially useful for treating binder twine.

No. 1,230,065—Gentry Cash, applied for Nov. 28, 1916, issued June 15, 1920. This covers a stuffing box for introducing revolving shafts into pressure stills. It is kept tight by pumping into the stuffing box oil under a pressure higher than the internal pressure of the still.

No. 1,343,647—Humphreys and Burton, applied for Nov. 28, 1916, issued June 15, 1920. This covers control apparatus for pressure stills one phase being regulating the flow of vapors to the condenser by means of a needle valve and the other regulating the speed of the stoker and consequently the heat of the still by means of the pressure existing in the still.

ALL of these patents are owned by the Standard of Indiana through assignment by the inventors. The other two patents are not at hand but they will be published as soon as received from the patent office.

The defendants ask that the plaintiff:

1—Clearly and precisely state which claims of each patent plaintiff will rely on, what acts of each defendant will be charged to infringe each of the claims of the nine patents recited.

2—To state definitely the steps or acts of each defendant alleged to constitute any infringing process or method, indicating whether such steps are charged to be separately novel in this art, or only charged to be novel in the combination for which defendants employ them and wherein such novelty is charged to reside.

3—To clearly state if infringement is charged to consist in a new use of either of the elements constituting such process or the apparatus, rather than in the novelty—; also specifying the peculiarities by which it is charged to be distinguished from former steps or elements before employed for a similar purpose.

4—To specify whether alleged infringement is based on any novel manufacture or use charged, definitely explaining wherein such offense is charged to consist as to each of the defendants and where it is charged to have been committed, giving in each case such particulars as may clearly inform defendants of the precise nature of the charge made against each of them.

5—To specify as to each of said patents respectively, how long before date of application plaintiff will assert the invention claimed in each of the several claims was made by the patentee.

6—To state specifically in what consists the conspiracy, and aiding, assisting and advising in respect thereto charged in said bill, what apparatus, processes or products they relate to and where, when and how such acts were committed, with as much definiteness as possible.

IN support of their motion, the defendants appear to indicate that they will depend on the defense that their process is based on the prior art and so does not infringe the patents cited against them, because the motion goes on to say:

"The bill of complaint charges infringement of nine patents each containing a multiplicity of claims relating or purporting to relate to improvements in an art publicly, openly and without license or title under either of said patents, practiced in this country and described in patents and printed publications many years before the earliest date of application for either of them, or any notice to either defendant that plaintiff asserted exclusive right to said alleged improvements; it fails to advise defendants concerning the nature and scope of acts complained of sufficiently to inform them wherein such acts con-

sist or enable them to make suitable, concise and proper answer. Their claims appear to relate either to unpatentable subject matter or to depend on frivolous or indefinite distinctions to differentiate them from the prior art with which defendants have long been acquainted.

"If the nature of the limitations on these patents imposed by the prior art and known to plaintiff, was adequately disclosed in the bill of complaint, so that the controversy would be confined to such improvements as either of said patentees has made on the prior art, the answer could be drawn within comparatively narrow limits and defendants believe, as they have throughout believed, that the charge of infringement could not be sustained against either of them."

In the effort to prevent the trial from developing into a battle of experts in which the real issue may be beclouded in a fog of words, the defendants in their motion go on to say:

"If plaintiff, at the trial, is at liberty to seek for these indefinite claims such variety of interpretations and expansion of the doctrine of equivalents as professed experts in its employ may then assert for them unless defendants have pleaded and proved such prior art, publications and patents as they presumably would if seasonably advised by the bill of particulars here prayed, great and unnecessary wrong may be done; whereas, if seasonably advised by a suitable bill of particulars, defendants may, in part at least, safeguard themselves against such a miscarriage of justice."

Defendants ask 40 days time after the bill of particulars prayed for is filed, to prepare their answer.

Freight Rates to be Discussed At Illinois Jobbers Meet

SPRINGFIELD, ILL., Feb. 7

FREIGHT rates from Group Three into Illinois will be discussed at the annual meeting of the Illinois Petroleum Marketers Assoc. here on Feb. 16 and 17. Following the action of the Interstate Commerce Commission in ordering into effect on April 20 the advanced rates from Group Three authorized last summer, the Illinois association on Jan. 15 filed with the commission a petition for leave to intervene and for rehearing of the case.

The association's petition says that the rates approved by the commission will cost the jobbers in Illinois about $20 more per car on shipments from Group Three. It asks to intervene on the side of the Mid-Continent refiners who have asked for reconsideration in the case.

Because of the reasonably healthy market conditions which have been created because of equality of rates in the past in the Oklahoma-Kansas field, the Illinois jobbers protest the commission's proposal to establish rates which vary to the extent of 2 cents per 100 pounds as between Kansas and Oklahoma, according to the February issue of "The Oil Can," the Illinois association's official publication. They urge the perpetuation of a parity in rates, at least in northeast Oklahoma and south central Kansas in order that competition will maintain a balance of production and price levels.

It is pointed out in the petition that in 1925 the commission approved the equality of rates between Kansas and Oklahoma on refined oil traffic to New Mexico and Arizona in the case of the Associated Oil Co., San Francisco, although the distance from Oklahoma averages 100 miles greater than from the Kansas field to representative destinations.

Other subjects which will be discussed at the meeting are the proposed gasoline road tax. In its favor will speak Frank T. Sheets, superintendent of Illinois State Highway Department, and opposing it, Sen. Lowell B. Mason, Chicago.

Among the speakers will be: G. A. Primm, secretary of the association, who will talk on the association emblem, its principle, and so on; F. A. Muench, president of Diamond Kerosene Co., Inc., Carlinville, Ill., whose subject will be "A Better State Association"; Dr. Jacque Morrell, Universal Oil Products Co., Chicago, whose subject is "Motor Fuels"; R. R. Cunningham, of La Salle Extension University, Chicago, who will talk on "Essentials of Salesmanship"; and V. Y. Dallman, managing editor, Illinois State Register, Springfield, whose "Smiles from the Face of Mother Earth" will be delivered on the evening of the first day.

Charles S. Rosenthal, vice president of Apex Motor Fuel Co., Chicago, and president of the association, will preside at the sessions. The greeting will be given by the mayor of Springfield and the chamber of commerce.

22,000,000-Bbl. Decline in Oil Stocks in Year

CLEVELAND, Feb. 5.—Above ground stocks of petroleum declined more than 22,000,000 barrels in 1926, according to the U. S. Bureau of Mines, to 519,649,000 barrels of crude and refined oils. Stocks of crude oil east of California declined 13,732,000 barrels to 278,077,000 barrels, and California crude oil stocks declined 1,104,000 barrels to 128,330,000 barrels.

Stocks of gasoline on Dec. 31 were 39,023,000 barrels, compared with 38,875,000 barrels at the end of 1925. The December gasoline output, 887,000 barrels daily average, was the largest in the history of the industry and domestic demand, 691,000 barrels daily average, was 16,000 barrels average more than the November demand. December, 1926, was the first instance of larger average demand in December than in November since the Bureau of Mines began compiling gasoline statistics nine years ago.

Kerosene stocks increased 505,000 barrels. Lubricant stocks declined 44,000 barrels. Gas and fuel oil stocks east of California decreased 1,961,000 barrels. Wax stocks increased 8,279,000 pounds.

Daily average production of crude increased 8500 barrels to 2,324,600 barrels, a new high figure. Stocks of crude east of California increased 978,000 barrels in December. California stocks increased 833,000 barrels.

Average Oklahoma production rose 8900 barrels to 570,700 barrels daily average. California production rose 15,000 barrels daily average to 654,100 barrels average. Texas production fell 3200 barrels daily average to 597,300 barrels.

Complete petroleum statistics will be published in the Feb. 16 issue of National Petroleum News.

J. G. Skelly, Seep Agency Man, Dies at Oil City

OIL CITY, PA., Feb. 8.—C. B. Johnson, Pittsburgh, has been placed in charge of the Oil City office of the Joseph Seep Purchasing Agency to fill the vacancy caused by the death Jan. 21 of J. G. Skelly.

Mr. Skelly was widely known to Eastern producers. He was with the Seep Agency about 40 years. One of his sons is with the South Penn Oil Co. at Pittsburgh. A brother was with the Seep Agency in charge of the Bradford office. When the brother died several years ago, Mr. Johnson filled in the vacancy there temporarily.

The Seep Agency Feb. 1 closed its crude buying offices at Emlenton, Pa., and Mannington, W. Va.

Lynch-Clarisey's New Plant

CHICAGO, Feb. 5.—The Lynch-Clarisey Oil Co., specialists in industrial lubricants and domestic fuel oils, have completed a 2,000,000-gallon storage plant on the Chicago & Alton railroad just west of the Chicago city limits. It also has two smaller plants, one in the northern part of the city which serves Evanston and other northern suburbs, and its original plant at 3211 Wood St. where its headquarters remain.

Industry Itself Must Stop Waste of Gas, Legislation Would be Harmful

By M. L. Requa

Chief of the Oil Division of Federal Fuel Administration During the War

IN view of the momentous issues involved it seems very necessary at this time that some one discuss from a detached point of view the reasons why it is imperative that the industry adopt cooperative action in the elimination of waste of gas. I have attempted this task. My effort will be to demonstrate that the proper policy to adopt is self-government of the industry, by the industry, as a voluntary effort as distinguished from control by government rules and regulations.

There is, I think, no possibility of inertia. It is the choice of one of two methods: Either voluntary or involuntary action, and of the two, the former is so obviously the more satisfactory that it would seem there is very little room for argument. What argument does arise perhaps is due to the fact that some people believe, and I think of course mistakenly, that it is possible to succeed with a 'do nothing' policy. This theory is fatal in that the alternative is, of course, government mandate.

We face a crisis that is no less a crisis because it is in time of peace than was that war-time crisis when the industry proved its ability as a voluntary effort to govern itself wisely and well. That lesson alone should indicate clearly the course to be followed at this time. The great fundamental principle that inspired the policy of the Oil Division was self-government. It is the principle that is at stake at the present time and to that extent the present discussion takes on prime importance.

I HAVE believed for 10 years that events would so culminate as to make necessary a decision on the part of the industry as to whether they would voluntarily cooperate in the attainment of certain objectives or whether they would be so blind to the trend of events as to force government action. I claim no super-powers of divination; I hold no brief to speak for any one save myself; I ask no man to accept my deductions until he has tested them from the standpoint of cold and unemotional logic. I have attempted in my utterances, and I am attempting now merely to forecast the future trend of events by the consideration of past events.

The accuracy of that forecast each one must judge for himself through study of the sequence of events over the past few years. It has been because of my profound conviction that the evolution of the industry could not be halted that I have been so concerned with the direction of that evolution in the benificent and constructive channels.

History proves conclusively the inability of the government to function satisfactorily or efficiently in any industrial capacity. Advocates of government ownership or undue interference with industry in the form of hampering or drastically restrictive legislation must in all conscience close their minds to historical precedent if they are to be in the least consistent in their advocacy of such an utterly discredited doctrine. Because of all of this background of experience, I am opposed to the passage of any legislation or exercise of any government control beyond that necessary to give to government the authority required to make possible the exercise of its proper function in behalf of public welfare.

I hope to point out why present conditions cannot be ignored. I am inviting attention to the danger of possible legislation at this time to correct those conditions. I am urging consideration of the very obvious fact that the industry cannot longer ignore the situation with safety to its own industrial future because it cannot halt the evolution that at the present moment is so much in evidence in connection with the problem of elimination of waste of gas.

I AM not asking the industry to enter any untried field. I am not suggesting that producers make any personal or financial sacrifice, but on the contrary I am trying to point out that on entering upon such a campaign if self-government, the industry will not only be rendering a great public service but at the same time will be rendering the individual producer a great financial service. Many lines of industry have already availed themselves of the cooperation of the Department of Commerce in bringing about elimination of waste.

This has been done not only with great benefit to the public, but also with great financial benefit to the industries involved. Savings have been brought about that amount to more than $500,000,000 a year. The savings are cumulative and will not only be repeated from year to year but will grow because of further activities. Consideration of this precedent should give the petroleum industry courage to adopt similar methods.

The whole question of the elimination of waste of gas is new. The technology is only now being worked out. But it has come to be recognized that the pumping of gas back into the formation, its resaturation with the gasoline fractions, and maintenance of the pressure that is the motivating force that causes the oil to flow to the surface is economic activity of the highest order.

It has been, curiously enough, only within the very recent few years that this great function of gas has been given serious recognition, but the more we think of it, the more we consider its function, the more we realize that its waste is not only detrimental to the public, but that it robs the producer of a very considerable amount of oil that will not be recovered if gas is permitted to escape uncontrolled into the atmosphere.

The technology that is being constantly added to upon this subject bears overwhelming testimony to the truth of what I have said, and if we assume it is true that the elimination of waste of gas and pumping it back into the formation is vital, we shall realize two results: First, it will make possible a greater production of oil from a given area, with consequent benefit to the public and, second, it will make it possible for the producer to realize a very much larger amount of money per acre of producing territory.

THIS control of gas pressure also makes it possible to bring about some rational rate of production. If there is one thing in the oil business that has been unsatisfactory it is this total lack of control of production. There is no other mineral industry where a similar condition exists. Any action upon the part of the industry that will tend to stabilize production so that oil is not produced when not needed, will be a service of the highest type, not only to the industry but to the public as well.

I shall not, in this discussion, make use of the word conservation, for the reason that many people think of conservation as the locking up of natural resources to remain untouched over a long period of time, with no consideration for the requirements of the present generation. But because many believe this is exactly what conservation means, I think it wise to offer a definition that will perhaps clear the atmosphere.

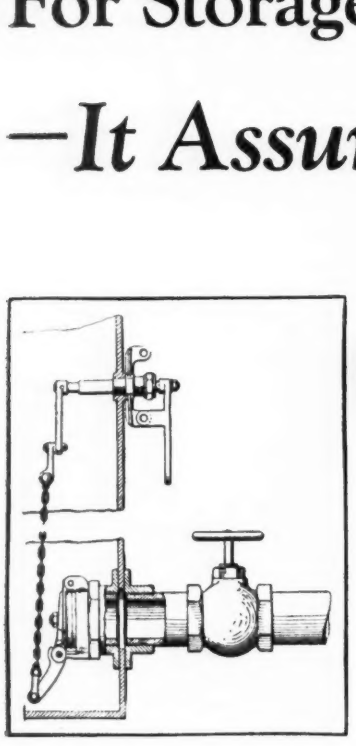
In the first place the dictionary's definition is 'efficient use.' A further definition that will apply is this: 'Conservation is not hoarding, but the wise use of natural resources and it implies not merely the preserving in unimpaired efficiency, but also a wise and equitable exhaustion with maximum efficiency and minimum waste.' The words 'elimination of waste' will be used in this discussion, particularly so as it is the

It's New!

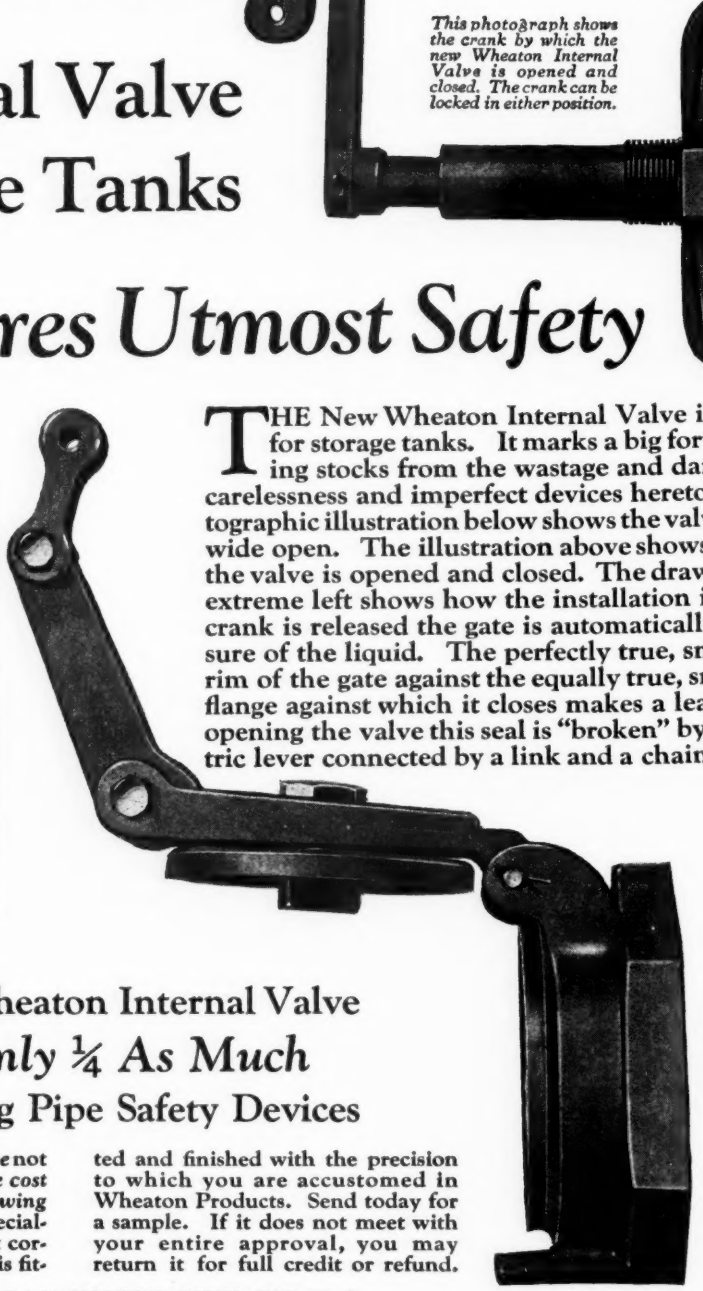
An Internal Valve For Storage Tanks

—It Assures Utmost Safety

This photograph shows the crank by which the new Wheaton Internal Valve is opened and closed. The crank can be locked in either position.



THE New Wheaton Internal Valve is especially designed for storage tanks. It marks a big forward step in protecting stocks from the wastage and dangers resulting from carelessness and imperfect devices heretofore used. The photographic illustration below shows the valve as it appears when wide open. The illustration above shows the crank by which the valve is opened and closed. The drawing in the box at the extreme left shows how the installation is made. When the crank is released the gate is automatically closed by the pressure of the liquid. The perfectly true, smooth surface of the rim of the gate against the equally true, smooth surface of the flange against which it closes makes a leak-proof seal. When opening the valve this seal is "broken" by means of the eccentric lever connected by a link and a chain to the crank above.



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The *new Wheaton Internal Valve* not only assures *safety* but its *whole cost is less than ¼ the cost of the old swing pipe device.* It is built of a special-analysis brass alloy that will not corrode or crystallize. Every part is fitted and finished with the precision to which you are accustomed in Wheaton Products. Send today for a sample. If it does not meet with your entire approval, you may return it for full credit or refund.

The photograph on the left shows the valve after the gate has been raised. Sizes: 2, 2½, 4 and 6 inches. Larger sizes built to specifications.

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phrase used by the Department of Commerce in its great nation-wide campaign.

We might, as a first and superficial impulse, suggest that the whole matter of elimination of waste be buried and forgotten. Even the most cursory consideration of the subject will show, however, that such a course is entirely impractical. The very development of the southwest; of the state of Oklahoma, should point the moral to my story. We have seen this vast domain of uninhabited prairie spring, almost overnight, into a great commonwealth. The speed and magnitude of that transformation is, in itself, eloquent testimony of the evolution that attends upon all modern industry.

ELIMINATION of waste (efficient use) must sooner or later become paramount in the mineral industry in supplying the demand created by just such transformations. Surely no one will say that such evolution may pass on its onward way, and leave the petroleum industry immune from change.

The development of modern transportation by means of the internal combustion engine is the most profound industrial change of the twentieth century. Our whole social fabric has been affected in a material degree. That development is founded upon the oil produced from the ground. Its very magnitude creates problems that were undreamed of with the dawning of the century; problems that reach back into all lines of industrial activity.

Steel, rubber, copper, leather, lead and an endless variety of other products are all in turn affected beneficially or injuriously by the plenteousness or the stringency of the supply of petroleum products, and because of this ramification of industrial interdependence the industry has had laid upon it a service of constantly growing magnitude. Petroleum has, in short, become a public necessity.

The fulfillment of the petroleum industry's service has been of constantly growing concern, both to the thoughtful minds within the industry and to the federal authorities, upon whose shoulders rests responsibility for the public welfare, for that service in an ever increasing degree has come to be an inseparable part of the public weal. To such an extent is this true that the industry cannot isolate itself and fail to consider all angles of the case. The report of the Federal Oil Conservation Board marks the beginning of a new era in the petroleum industry—an era of rational cooperation, as distinguished from the old era of reckless attack upon the part of government and reckless waste upon the part of the industry.

IT marks an era of intelligent government understanding, distinct from the old punitive idea that criticized everything, but offered nothing constructive as an alternative. This change of policy on the part of government is not only welcome, but it is a change that, because of economic necessity, should have been made long ago.

The era of cooperation that it visualizes, the change from old methods to new, is part of the inevitable industrial evolution in which we are constantly involved, and which, from the nature of the case, must undergo a still more profound change. Individuals may help or hinder that progress, but in the end they are as powerless to stop it as they are to stop the sunrise, for it is part of the evolution of mankind that moves as unerringly as does the increase of population, or the progress of science or invention.

The whole question of industrial progress is involved with all its phases of synthetic chemistry, substitutes, public relations and the infinite complexities of modern civilization, in fact, the whole fabric of our modern social and industrial structure is inextricably linked with the development of the problem that now confronts us.

IT is for the industry to determine the method of solving that problem. It will, of course, be solved either through the industry's cooperative efforts, wisely directed, or through public mandate, by law, for it is certain that some solution must soon be forthcoming that will, in behalf of the public, give or permit a more intelligent type of operation than is now in evidence.

The industry deals with a wasting asset. It is confronted with enormous increases in per capita consumption in addition to the normal increase in population. It is faced, therefore, with an ever increasing demand and an ever diminishing source of supply. The new policy that has been enunciated by the government recognizes these facts and calls for the elimination of waste of gas as a means to the more efficient use of this great natural resource. Upon the shoulders of the industry should rest the responsibility for bringing about this necessary change.

As a result of the report of the Federal Oil Conservation Board, the report of the Committee of Eleven of the American Petroleum Institute, and the recent resolution of the Institute at its Tulsa meeting, the debate that has been raging for years over the question is at an end. Elimination of waste is no longer a debatable question. Recognizing this, the industry at the Tulsa meeting set its hand to the plow—it cannot turn back. The question today therefore, revolves entirely around the method of procedure

THERE are at present two schools of thought at struggle within the industry, one advocating legislative control in minute detail, the other proposing a law that will simply state the broad fundamental that waste of gas will not be permitted and affix a penalty so heavy that the industry will find ways and means to eliminate that waste. Of these two the latter is by far preferable. The question immediately arises, however, as to the wisdom of asking for any legislation at this time, and instead attempting to reach the objective through voluntary cooperation and industrial self-government, making use in the last analysis, if necessary, of existing law.

Elimination of waste is a comparatively new problem; methods are still largely in the formative stage, uncertain, untried, and, to a degree, fraught with profound possibilities for constructive or destructive results. The picture is such an entire reversal of old tenets, so complete a departure from all practice long recognized as standard, and perhaps as inviolable and infallible, that the very profundity of the change should spell caution. Such being the situation—and no one familiar with the case will deny the correctness of the diagnosis—the question immediately arises as to what method of procedure will most definitely avoid possibilities of disasterous or unfortunate results, and what action will most surely promote the national welfare, and the welfare of the petroleum industry.

THIS plea, frankly, is made in behalf of voluntary cooperative action as distinguished from legal mandate; it attempts to apply to the existing situation the same philosophy that governed the Oil Division of the United States Fuel Administration, and that was embodied in the slogan—

> The oil industry can govern itself wisely and well if it will. It can formulate its own rules and regulations far more satisfactorily by voluntary effort than through government mandate.
> (Remarks before the National Petroleum War Service Committee, by M. L. Requa, July 12th, 1918.)

That theory of control is particularly applicable today because of the fact that there is probably available, under existing law, the necessary authority ultimately to discipline recalcitrant objectors.

There are two parties at interest in the solution of this problem. On the one hand the public, upon the other the pe-

BULLETIN

TULSA, Feb. 7.—The special committee of 15 of the executive committee Mid-Continent Oil & Gas Association, Oklahoma-Kansas division, met this afternoon and submitted its report. This report, which was adopted, declares the association to be opposed to the Marland conservation bill as: "In principle and in all its provisions it is revolutionary, drastic and dangerous, is unsound in principle and unworkable in practice." A committee of 10 was then appointed to attend the hearing of Oklahoma City on Wednesday in opposition to the bill which will be discussed by the senate and house committees on oil and gas in joint session. A minority report was offered by Charles C. Brown, vice president of the Marland Oil Co. and seconded by J. H. Brennan, general counsel for the Barnsdall companies who made a spirited argument in favor of some definite action by the association on conservation.

New Oil Plant

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Photo by Chesapeake Aircraft Co.

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troleum producers. Neither can, with justice, be ignored. Both have very definite rights that must be given consideration. The public as a matter of self-interest cannot justify action that will embarrass, impede or prevent the industry from performing its great function of public service.

Industry, on the other hand, cannot justify action that will deprive the public of the most efficient, continuous and satisfactory service. That service can come only through cooperation in the elimination of waste. To this extent the interests of both parties are identical. What, then, is the procedure that will most nearly meet this definition of joint responsibility and identity and community of interest and that will best solve the problem?

To begin with, the first question to be answered, and that must be answered before we can proceed with the discussion is this:

IS it wise or necessary at this time to ask for government interference in the form of legislative enactment, either state or federal, that will by legal mandate compel the industry to do something that from every angle of the case the industry should and can do as a voluntary act of its own?

The answer to this question is, of course, NO provided the industry can, and will, of its own volition take the action necessary to attain the desired objective.

Many of us have a false conception of what government really is. It is not a mysterious super-power endowed with infinite wisdom, gifted with unerring foresight, governed by unbiased, unemotional and unswerving administration of justice, nor is it so constituted as to make possible its incursions into the field of industrial effort, save at the expense of industrial efficiency.

Our public officials are, after all, merely private citizens, raised for the moment by public suffrage to official positions of authority. In such capacity of trusteeship their function should be to provide safety of life and property and exercise the least possible control of the individual, compatible with public welfare. Having done this the individual should be left free to work out alone, or in cooperation with others his own industrial fortune.

Unfortunately, this is often not the case. The temptation to tinker with the industrial structure seems inherent with our public officials—the more impractical the official, the stronger the temptation seems to be.

We have, of course, delegated to responsible authority, representing government, the right to supervise, in behalf of public welfare, the activities of great public utility corporations such as railways, water and electric corporations, that best serve the public in monopolistic form. But even here control does not go, in the main, beyond the rate fixing function. It does not attempt to go into minute details of operation and lay down rules and regulations to govern every possible contingency that might be expected to arise. Certainly there has never yet been developed any serious school of thought that argues the necessity for government control of all competitive industry. The strategy of the situation is so obvious that it seems almost unnecessary to indicate it. The industry should boldly and confidently assert its ability to govern itself under existing law rather than to ask for new and special legislation.

IT may be laid down as axiomatic that the less legislation industry is subjected to, the better off it will be, provided there is enough common law available to meet the situation.

Is it not wise in view of what has been said to approach the present problem with full resolve to exhaust every individual and cooperative effort before suggesting legislation to cure the situation that can in all reason be cured by industrial rather than governmental effort, provided the industry has the vision and the will to do it? That government mandate must come, if industrial cooperation fails, is no longer debatable, but before it does come the industry should exhaust all other possible remedies before asking special legislation.

If we are not to have legislation at this time—and it can probably be demonstrated that it is not only unnecessary but unwise provided the industry will cooperate—the question arises, of course, immediately what action is to be taken in view of the fact that inertia is impossible.

We are in a rapidly flowing current of industrial progress that moves irresistibly onward; we cannot stop that movement; we may by wise measures prevent it becoming a devastating torrent; its complete stagnation is, however, impossible. If we will once get in our minds this picture of constant movement that cannot be halted, we will have gone a long way in realizing the necessity for action through cooperative industrial effort. If to this we add intelligent conception of the function of government and the understanding that government should be appealed to only as a last resort—perhaps we might safely say as a last desperate resort—we shall have laid an adequate foundation upon which to build an intelligent understanding of the present problem.

WE may safely assume the following propositions as axiomatic:

(1) The best government is the one that protects the interests of the individual and the community with least interference with individual activity and with the fewest number of laws.

(2) The interests of both the public and the industry must be equally considered; those interests are identical from the point of view of efficient, continuous and satisfactory service to the public.

(3) Any proposal that will tend to interfere with the public service of the oil industry is to be deprecated, as unwise and harmful.

(4.) Appeal to government for legislative mandate should be the last resort, a sort of *sauve qui peut* proposition—a forlorn hope, if you please, to be advocated only after everything else has failed.

Those who have had close contact with both state and federal legislation, who know something of the difficulties encountered in protecting industry from unwise legislative action, have no illusions regarding the desirability of keeping clear of legal entanglements in the form of more laws. We have too many laws now, many of them bad, others impracticable, some dead letters: Half of them could probably be repealed with much benefit to the public.

Why add another law to an already over-burdened structure if means are at hand to accomplish the desired result without legislation? No one will argue against the passage of necessary laws. The question as to what is necessary, however, might be the subject of some interesting and illuminating discussions. This is not an argument against necessary legislation. It is, on the other hand an effort to point out the folly of rushing blindly into an ill-considered position and demanding the passage of legislation that is perhaps not only unnecessary, but is probably highly unwise.

GOVERNMENT control under legal enactment is inelastic and immobile. Certain propositions are laid down as the law, deviation from them becomes an illegal act. If there is one thing the petroleum industry wants during this period of 'cut and fit' that is just ahead

How N. P. N. Will Cover A. I. M. E. Meeting

IMPROVED production methods and developments in refining practice are new features of the program for the meeting in New York Feb. 14 to 17 of the Petroleum Division of the American Institute of Mining and Metallurgical Engineers, in addition to discussion of possibilities of oil production here and abroad.

To give its readers full information on new ideas brought out there on production methods, National Petroleum News has arranged with Prof. Lester C. Uren, professor of petroleum engineering, University of California, to cover for it this part of the program. Prof. Uren is author of the series of special articles on this same subject now running in National Petroleum News.

Developments in refining practice brought out at the New York meeting will be written by Paul Truesdell, staff writer on this subject for National Petroleum News.

of us, it is mobility. The ability to go ahead, back up, or side-step with the same facility that characterizes the footwork of the finished boxer is highly desirable.

Standing toe to the scratch and attempting to 'slug' through to the objective by legal mandate offers little of encouragement. It is not brute force, in the form of law enactment that is wanted at this time, but rather the application to this problem of the intelligence and brains with which the oil industry is so conspicuously equipped.

If the industry will apply to this problem collectively and cooperatively, half the brains and intelligence that they apply to technical and industrial problems of every day routine, the matter will be quickly and satisfactorily disposed of.

Under a plan of industrial self-government, experiments can be tried, changes made, methods discarded, and new ones adopted: in short, on a moment's notice, action can be had. Legal mandate is rigid and unyielding,—self-government is mobile and elastic. In view of the experimentation that must necessarily be undertaken there can be little debate as to which is likely to produce the most satisfactory results.

Now as to the tools at hand: It has been said that the courts are open for issuance of injunctions under the doctrine of neighborly conduct. Under this doctrine gas cannot be recklessly wasted over the protests of other operators. The facts in the case are easy of proof, the whole trend of technical progress in the past two years or more has served to lay continuously increasing emphasis on the vital part that gas plays in oil production. Technical men called as witnesses could easily substantiate the contention that gas is the determining factor and that the elimination of its waste is the greatest single factor in proper pool development and oil extraction.

ASSUMING all this to be true, does it not follow that control can be had through court injunction, if necessary, to prevent wilful destruction of values no less real because buried beneath the surface? This is a question that the legal committee of the American Petroleum Institute might well answer. If the answer is no, then legislation is inevitable and more is the pity.

But, is even this appeal to the courts necessary? Public opinion is a tremendous power, and could an individual or corporation long endure the opprobrium that would follow the knowledge of recalcitrancy?

This leads to a second suggestion:

It is necessary for the industry to conduct a real campaign of intelligent education, and teach the public the simple fundamentals of what elimination of waste means and what it will accomplish, its necessity and the public benefit to flow from it. Such a campaign is an integral part of the program, without it the ultimate results are surrounded with an unnecessary atmosphere of doubt, with it the industry can win support for any proposal founded on truth, honesty and integrity of purpose.

We can safely assume one more statement as axiomatic:

A condition of stagnation is impossible. We shall make progress in some direction and under some authority. It is for the industry to say whether that authority shall be the authority of the industry itself under cooperative voluntary action, or whether it shall be the dead hand of government clamped upon industrial freedom by men innocent of any training in petroleum problems, ignorant of technical details, and they themselves hindered by legal restrictions they are powerless to correct or ignore.

THE train of thought opens up an endless vista of turmoil, and strife that is to distressing to contemplate with any equanimity. To put the argument specifically, the industry should adopt the war-time slogan of the Oil Division:

> "The oil industry can govern itself wisely and well if it will. It can formulate its own rules and regulations far more satisfactorily by voluntary effort than through government mandate."

Because of the comparatively small amount of scientific and technical information available, the industry must feel out its problem with considerable degree of caution. No irrevocable step should be taken, no definite pronunciemento announced, but rather the whole subject should be maintained in liquid condition so that a move may be made in any direction as the circumstances warrant.

Each field may be found to be a problem unto itself. It would seem, therefore, that the producers in each field should form themselves into an independent local committee to study their own problems. They may require skilled technical assistants. If so, it will be for them to determine the fact and to take necessary measures to supply that type of talent.

Out of such field organizations might ultimately grow some central organization that will coordinate all of the information and make it available to all. There might even be exchange of information between the various states and the ultimate building up of standard practice that will make available the best of the practice of each field, so that all may have the benefit of the individual research.

I AM offering no hard and fast program, but am simply urging the wisdom and the necessity for some concerted movement upon the part of the industry that will bring about some organized consideration of the problem and some intelligent and rational attempt at solution by the industry, within the industry, in contra-distinction to the proposals that have been made that there must be at this time legislation passed to deal with this subject

If, after this plan has been tried and it has been found impracticable, it will be time enough to suggest legislation. At least under such a program experience will have been gained that will be of great value in teaching the industry what not to ask for in the form of legislation if, and when such legislation is finally proved to be necessary.

IT might be said that the proposal to seek cooperative action is not new; that it has been tried over and over again, and that it has failed. In part this is true—in part it is not true. There never has been a proposal involving all fields, nor has the industry ever been quite so definitely put upon notice that it is either self-government, through voluntary effort in the correction of waste, or legislative government through legal mandate.

The report of the Federal Oil Conservation Board points the way It is for the industry to accept the suggestions therein made and to prove its ability to grapple successfully with its own problems; to solve them through voluntary and cooperative effort under authority of existing law, if necessary, rather than to appeal for unneeded and perhaps harmful special legislation that will consciously or unconsciously affect that freedom of action so necessary and so imperative in anticipating the kaleidoscopic changes that are so characteristic of the production of petroleum.

The very nature of the industry is such that it must have the maximum freedom of effort in rendering its public service. Anything that would hamper that effort is utterly without justification, and yet that effort is being hampered today—on one hand through lack of cooperative effort that permits inexcusable waste of gas with consequent loss of production, and on the other hand it is threatened with special legislation that might under political control put the industry in a straight-jacket.

What has already been said has been said in vain if it has failed to show that voluntary industrial cooperation plus an aroused public opinion is the proper course to follow if the industry has the wisdom to see and the will to execute.

Under the stress of storm people are prone to appeal to government in the mistaken idea that government can accomplish the impossible; can nullify by legal mandate the operation of economic law, but it would be but poor tribute to the brains, the intelligence, the energy and the virility of the producers of petroleum to think that they must needs turn to government rather than to the solution of their own problems through their own efforts,—government of the industry, by the industry, in behalf of the public interest.

Visitors at Marland Office

CHICAGO, Feb. 5.—Two distributors of Marland products called at the Chicago division offices of the Marland Refining Co. here early this week. They are J. J. Swarthout of Lansing, Mich., and Charles Coberger, of Coberger & Co., Long Island, N. Y., who came in on his way home from Marland's refinery at Ponca City, Okla.

NATURAL GASOLINE

Motor fuel is essentially a regional product, each section demanding a different quality to meet climatic conditions.

A gasoline which will give satisfactory motor performance in a warm climate will not give equally satisfactory results in a cold climate.

Gasoline suited to the climate of Florida will not give satisfactory winter service in the Dakotas.

A regional motor fuel can easily be made to meet these varying conditions by the use of proper percentages of NATURAL GASOLINE to give the necessary volatility to refined gasoline.

The program of research and road tests being conducted to determine the values of NATURAL GASOLINE has developed many new and interesting facts. Bulletins covering the progress of this work are available free to those interested on application to Research Department, Association of Natural Gasoline Manufacturers, Cosden Building, Tulsa, Oklahoma.

ASSOCIATION OF NATURAL GASOLINE MANUFACTURERS

RESEARCH DEPARTMENT ASSOCIATION OF NATURAL GASOLINE MANUFACTURERS

Compilation Of Mid-Continent Refinery Operations

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National Petroleum News

Mid-Continent Refinery Operations Week Ended Feb. 4 (By Telegraph)

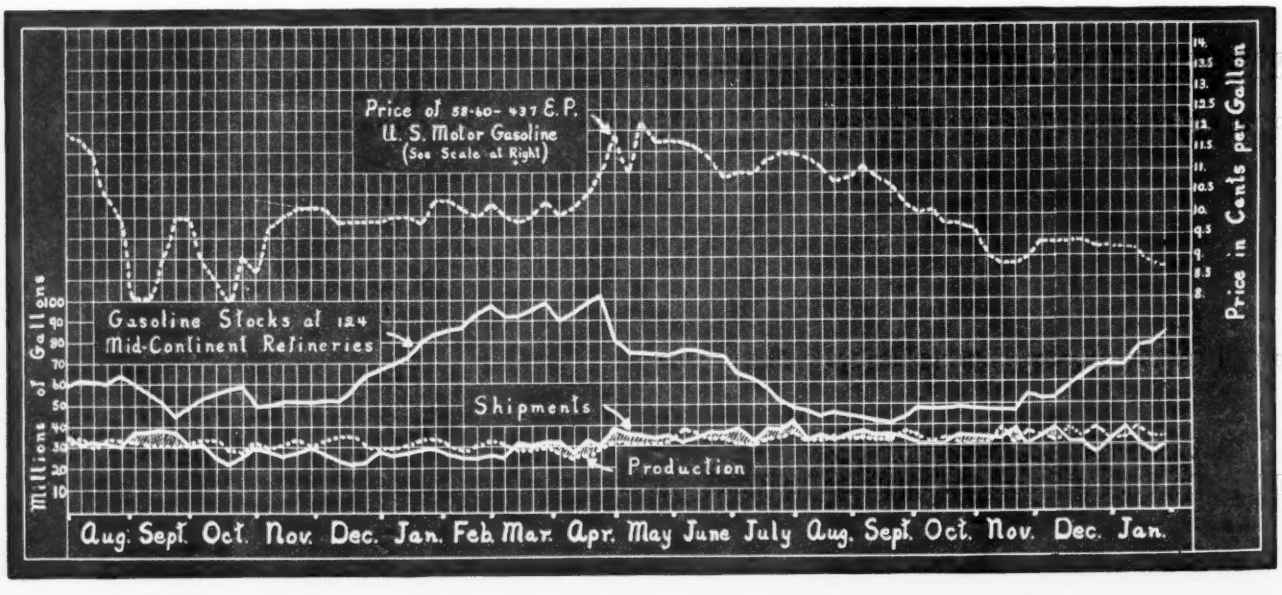
	Kansas	Oklahoma	North and Cent. Texas	North La.-Ark.	Total Week Ended Feb. 4	Total Week Ended Jan. 7
Plants Reporting	23	46	41	14	124	124
Crude Cap. (Bbls.)	98,200	165,900	144,300	53,700	462,100	462,100
Cracking Capacity	21,000	45,800	15,750	20,200	102,750	102,750
Da. Av. Crude Runs	46,768 — 9.1	102,553 — 3.8	62,471 + 1.6	49,446 + 2.7	261,238 — 2.5	265,867
Da. Av. Other Oils	7,794 +27.4	1,336 — 3.8	6,803 — 7.6	848 —21.2	16,781 + 5.3	13,255
GASOLINE—Gallons						
Stocks Jan. 28	11,456,704	51,071,746	13,512,596	3,256,441	79,297,487	66,756,702
Prod. 1-28 to 2-4	7,975,993 + 3.3	16,456,911 + 0.8	6,339,394 — 2.1	3,813,083 + 7.7	34,585,321 + 1.6	31,724,173
Ship. 1-28 to 2-4	7,969,558 + 3.6	13,459,927 + 9.0	5,102,840 — 4.1	3,681,828 +19.2	30,214,153 + 6.2	30,364,058
Stocks, Feb. 4	11,463,139 + 0.1	54,068,730 + 5.9	14,749,090 + 9.2	3,387,696 + 4.0	83,668,655 + 5.5	68,116,817
Ratio Sales to Prod	99.9%	81.8%	80.5%	96.6%	87.4%	95.7%
KEROSENE—Gallons						
Stocks Jan. 28	3,380,699	6,242,192	2,205,344	994,894	12,823,129	12,536,170
Prod. 1-28 to 2-4	1,465,058 —16.9	2,330,523 —13.1	1,277,396 —15.8	531,068 —13.1	5,604,045 —14.7	5,264,918
Ship. 1-28 to 2-4	1,562,485 + 5.6	1,790,531 —30.3	1,379,708 +17.9	638,611 —17.5	5,371,335 —10.4	4,880,270
Stocks Feb. 4	3,283,272 — 2.9	6,782,184 + 8.7	2,103,032 — 4.6	887,351 —10.8	13,055,830 + 1.8	12,920,818
Ratio Sales to Prod	106.6%	76.8%	108 0%	120.2%	95.8%	92.7%
STOVE DISTILLATE—Gallons						
Stocks Jan. 28	2,113,328	4,294,614	1,072,655	44,646	7,525,243	10,313,051
Prod. 1-28 to 2-4	671,598 + 7.4	431,864 —51.3	386,542 +23.7	55,574 — 7.7	1,545,578 —18.0	1,858,801
Ship. 1-28 to 2-4	934,124 —23.0	604,557 +17.9	311,029 —12.4	70,874 — 2.2	2,386,484 — 6.4	2,243,569
Stocks Feb. 4	1,850,802 —12.4	3,656,021 —14.9	1,148,168 + 7.0	29,346 —34.3	6,684,337 —11.2	9,928,283
Ratio Sales to Prod	139.1%	247.9%	80.5%	127.5%	154.4%	120.7%
GAS OIL—Gallons						
Stocks Jan. 28	3,581,178	30,666,785	9,632,929	3,076,432	46,957,324	46,971,401
Prod. 1-28 to 2-4	1,415,656 — 7.9	2,454,110 +27.2	1,763,763 +39.1	2,627,966 +35.7	8,261,495 +23.8	8,047,843
Ship. 1-28 to 2-4	1,825,898 — 0.7	2,029,248 — 6.8	1,629,104 +31.5	2,420,439 +35.9	7,904,689 +12.4	7,858,661
Stocks Feb. 4	3,170,936 —11.5	31,091,647 + 1.4	9,767,588 + 1.4	3,283,959 + 6.7	47,314,130 + 0.8	47,160,583
Ratio Sales to Prod	129.0%	82.7%	92.4%	92.1%	95.7%	97.6%
FUEL OIL—Gallons						
Stocks Jan. 28	7,622,706	51,699,809	11,636,640	7,287,822	78,246,977	89,524,608
Prod. 1-28 to 2-4	4,621,919 — 7.6	6,512,267 — 0.4	7,396,311 —12.4	7,128,993 — 8.2	25,659,490 — 7.5	27,189,387
Ship. 1-28 to 2-4	3,756,507 —29.0	8,796,075 +15.0	7,778,741 — 3.8	8,195,902 +11.4	28,527,225 + 0.5	32,079,598
Stocks Feb. 4	8,488,118 +11.4	49,416,001 — 4.4	11,254,210 — 3.3	6,220,913 —14.6	75,379,242 — 3.7	84,634,397
Ratio Sales to Prod	81.3%	135.1%	105.2%	115.0%	111.2%	118.0%

Gasoline Produced by Various Methods, Week Ended Feb. 4

	Kansas	% of Total	Oklahoma	% of Total	Texas	% of Total	Louisiana-Arkansas	% of Total	Total	% of Total
Straight Run	4,792,743	60.1	12,063,476	73.3	5,247,539	82.8	1,463,958	38.4	23,567,716	68 1
Cracked	2,717,974	34.1	3,062,329	18.6	983,519	15.5	1,989,185	52.2	8,753,007	25.3
Natural	465,276	5.8	1,331,106	8.1	108,276	1.7	359,940	9.4	2,264,598	6 6
Total	7,975,993		16,456,911		6,339,334		3,813,083		34,585,321	

+ or — columns are % change over previous week.

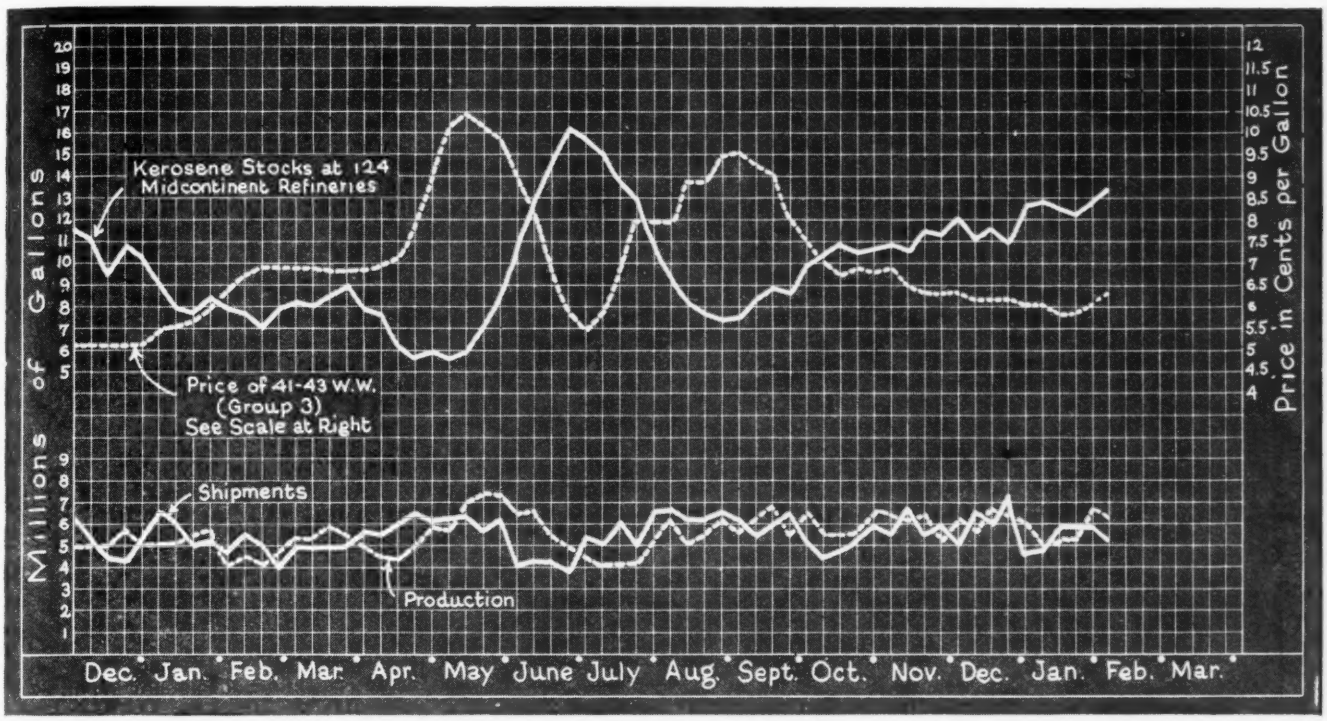
GASOLINE


Price of 58-60- 437 E.P. U. S. Motor Gasoline (See Scale at Right)
Gasoline Stocks at 124 Mid-Continent Refineries
Shipments
Production
Millions of Gallons
Price in Cents per Gallon
Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan.

Barometer of Mid-Continent Refinery Market—Week Ending Feb. 4

Charted Course of Prices, Production, Shipments, Stocks of Principal Refined Products, Week by Week, From Reports Made by 124 Plants to National Petroleum News

KEROSENE


Millions of Gallons
Price in Cents per Gallon
Kerosene Stocks at 124 Midcontinent Refineries
Price of 41-43 W.W. (Group 3) See Scale at Right
Shipments
Production
Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar.

Gasoline Shipments Increase From 124 Refineries

Staff Special—By Telegraph

TULSA, Feb. 8

THE phenominally large movement of gasoline from Mid-Continent refineries to distributors and exporters continued in the week ended Feb. 4. Reports from 124 plants in the Southwest, tabulated by National Petroleum News, showed gasoline shipments totaled 30,214,153 gallons. This was an increase of nearly 2,000,000 gallons over the week ended Jan. 28 when the same group of plants reported shipments totaled 28,455,282 gallons. Shipments for the last five weeks have averaged well over 30,000,000 gallons a week while a year ago shipments from the same plants averaged only 25,000,000 gallons a week.

Production of gasoline was changed only slightly during the week with the result that stocks continued their normal winter accumulation. At the end of the week reserves totaled 83,668,655 gallons, or 19 days' supply at the current rate of shipment. The increase in stocks during the week totaled 4,371,000 gallons.

On Feb. 5 a year ago gasoline stocks at the same group of plants were 84,959,053 gallons or 23 days' supply at the rate of shipment then.

Kerosene stocks increased 230,000 gallons when shipments fell off 620,000 gallons. Total stocks Feb. 4 were 13,055,839 gallons or a little less than 17 days' supply.

A year ago stocks of kerosene were much lower, having been reduced steadily over a long period. On Feb. 5, 1925, kerosene stocks at the 124 plants totaled 8,214,138 gallons, a little less than 12 days' supply at the rate of shipments then.

The steady reduction in stocks of stove distillate continued and was somewhat accentuated by a reduction of 340,000 gallons in production. Stocks were reduced 840,000 gallons to a new low figure for the season of 6,684,337 gallons. A year ago the total of stove distillate stocks was 7,554,010 gallons, a little less than a million gallons more than at present. In the last four weeks stocks of distillate have been reduced 3,243,946 gallons at all plants.

Shipments of fuel oil showed virtually no change, totaling 28,527,225 gallons. Production, however, was reduced 2,000,000 gallons to 25,659,490 gallons, causing a reduction in stocks of 3,000,000 gallons. Stocks on Feb. 4 totaled 75,379,242 gallons as compared with 101,722,424 gallons on Feb. 5 a year ago. During the last four weeks fuel oil stocks have been reduced 9,255,155 gallons. Stocks of gas oil increased 400,000 gallons in the last week to 47,314,130 gallons. During the last month gas oil stocks have shown virtually no change.

Completion of additional cracking facilities at several Kansas refineries increased the production of cracked gasoline in that state. Thirty-four per cent of the Kansas gasoline production was cracked as compared with 27.9 per cent the previous week.

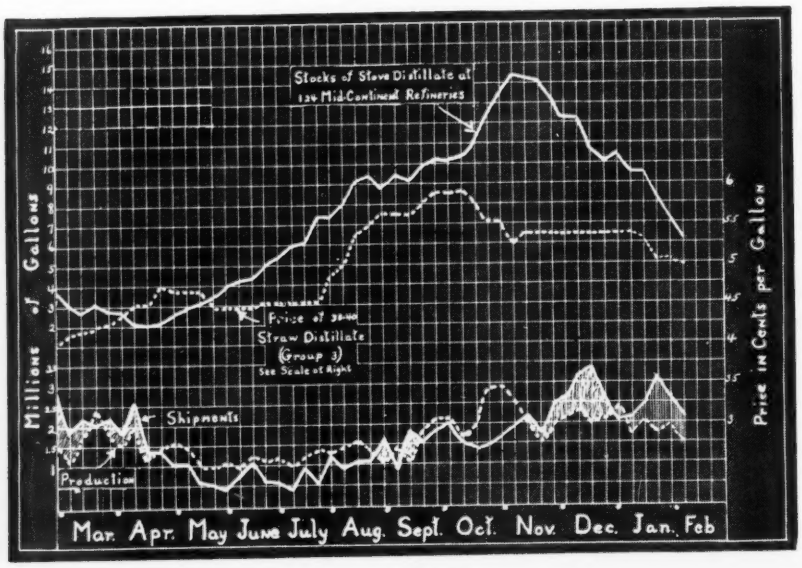
Summary for the Month

Production and shipments, all reporting refineries, for four weeks ended Feb. 4. Change in stocks figured from Jan. 7.

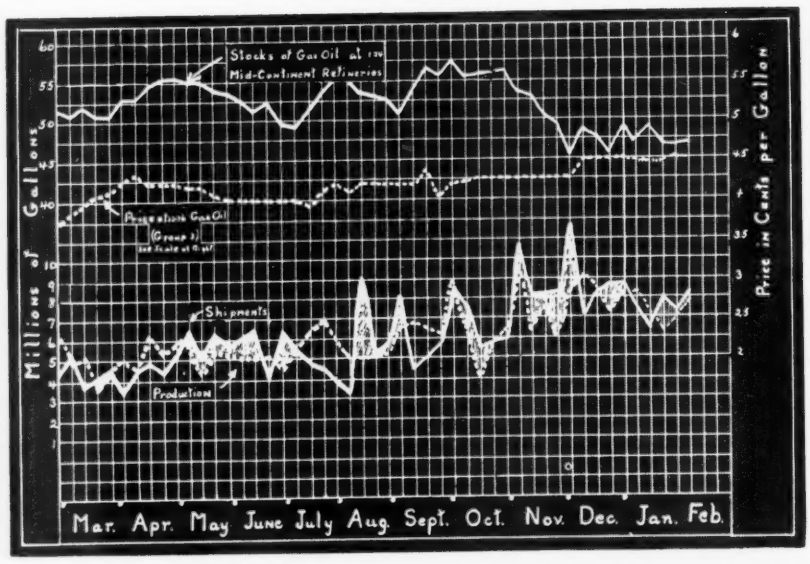
	Gallons
Gasoline	
Production	139,750,607
Shipments	124,198,769
Net change in stocks	+15,551,838
Ratio sales to production	88.9%
Kerosene	
Production	23,554,661
Shipments	23,419,640
Net change in stocks	+135,021
Ratio sales to production	99.4%
Stove Distillate	
Production	7,349,443
Shipments	10,593,389
Net change in stocks	—3,243,946
Ratio sales to production	144.1%
Gas Oil	
Production	29,196,927
Shipments	29,043,380
Net change in stocks	+153,547
Ratio sales to production	99.5%
Fuel Oil	
Production	109,603,921
Shipments	118,859,076
Net change in stocks	—9,255,155
Ratio sales to production	108.4%

Barometer of Mid-Continent Refining Market—Week Ending Feb. 4

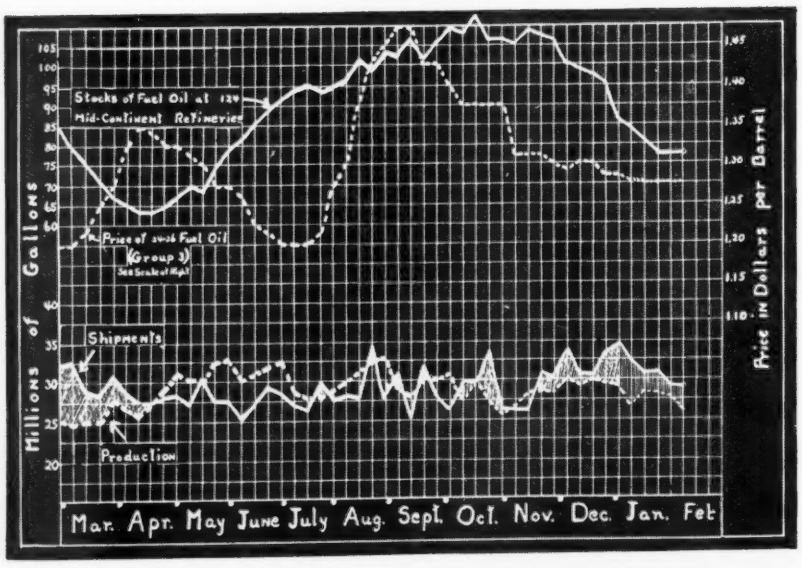
STOVE DISTILLATE


Stocks of Stove Distillate at 129 Mid-Continent Refineries
Price of 28-40 Straw Distillate (Group 3) See Scale at Right
Shipments
Production
Millions of Gallons
Price in Cents per Gallon
Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb.

GAS OIL


Stocks of Gas Oil at 129 Mid-Continent Refineries
Shipments
Production
Millions of Gallons
Price in Cents per Gallon
Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb.

FUEL OIL


Stocks of Fuel Oil at 129 Mid-Continent Refineries
Price of 24-26 Fuel Oil (Group 3) See Scale at Right
Shipments
Production
Millions of Gallons
Price in Dollars per Barrel
Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb

Gravity Test Opposed as Gasoline Gauge

CLEVELAND, Feb. 8.—Hubert B. Fuller, Cleveland, of Chamberlin, Marty & Fuller, counsel for several of the large Independent oil companies in Ohio, has protested to the motor vehicles committee of the Ohio house of representatives against the Knapp bill which if enacted would require the posting at the pump of gravity of gasoline sold through that pump.

Mr. Fuller in a letter to Lawrence H. Norton, chairman of that committee, pointed out that gravity was no longer a criterion for gasoline and asked that Ohio not put the oil industry in a straightjacket which would prevent the industry in this state from keeping abreast the discoveries and inventions that are constantly being made in the development of motor fuels.

A bill amending several minor points of the present gasoline tax law has been introduced.

Kansas Wildcat Finds 41 Gravity Oil

Staff Telegram

TULSA, Feb. 8.—Barnsdall Oil Co. has an interesting wildcat showing in Butler county, Kansas, 12 miles northwest of Wichita and 10 miles from nearest production which is in Towanda field to the east. The new well which is in northeast corner NW SW of 20-26-3 east, had lime at 2850 feet and chat formation from 2857 to 2859 feet total depth.

It swabbed about 700 barrels in three days and is now on pump for test. Oil is 41 gravity and fills up at rate of 17 barrels an hour in five-inch casing. Barnsdall has 1880 acres in block. Phillips Petroleum Co. has northeast offset 80 acres and Empire has east offset 80 acres. Both are moving in rigs.

Skelly Ships New Gasoline To Wisconsin

MINNEAPOLIS, Feb. 7.—The first car of the new Skelly refractionated gasoline to go into Wisconsin will be received by the Lodi High Test Oil Co., Lodi, Wis., according to R. M. Ward, sales representative in Wisconsin for the Skelly Oil Co. The gravity of this gasoline is 63°; initial boiling point, 88°; end point, 395; color 30 Saybolt, and doctor sweet.

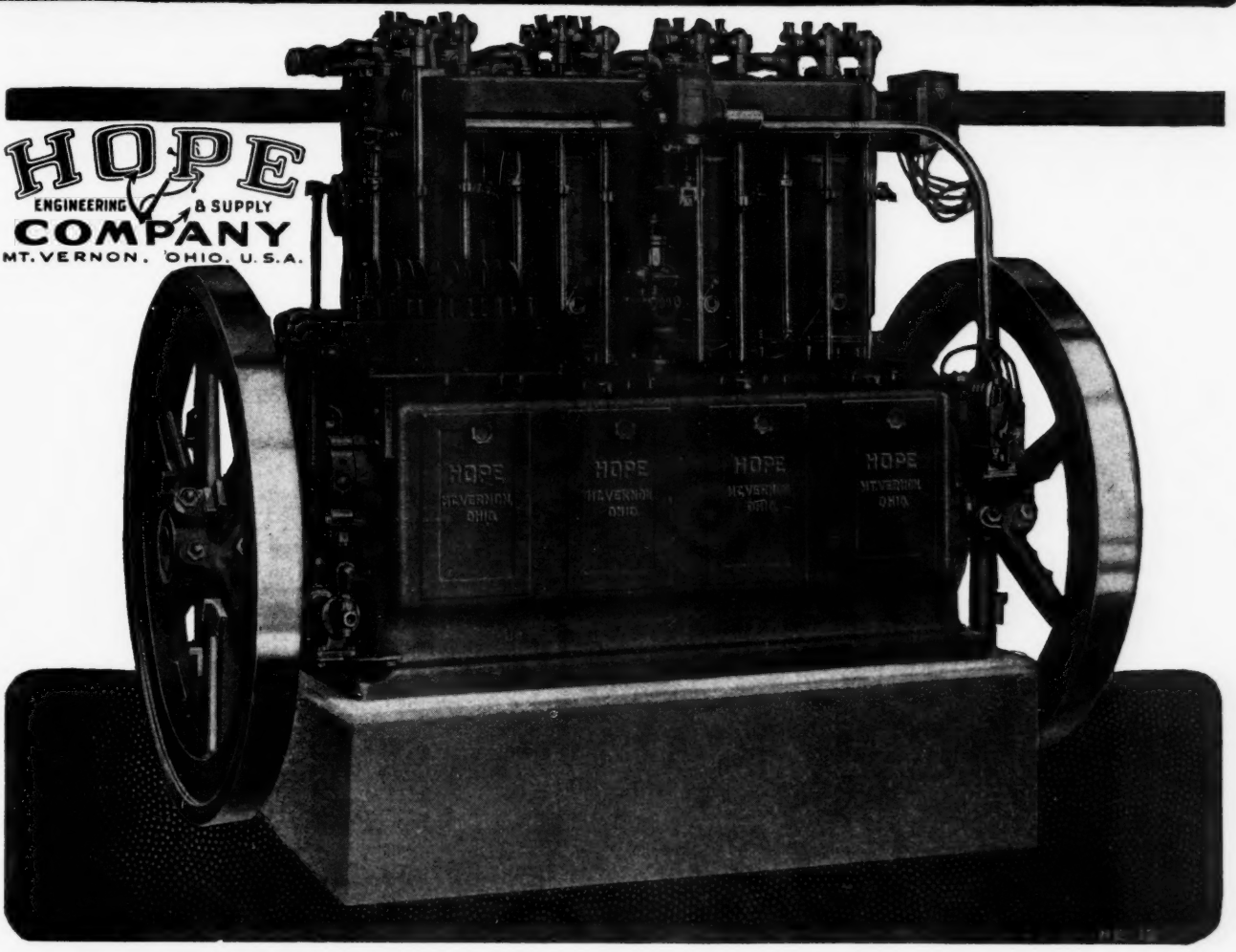
It is replacing both high and low test gasoline of the Skelly and is being sold at the tank wagon price, Mr. Ward states. It is sold without the 1-cent quantity discount allowed by the Standard Oil Co. of Indiana.

Stoll's Health Improves

CHICAGO, Feb. 5.—Arthur Stoll, Central Commercial Co., who recently underwent a major operation at Rochester, Minn., has returned to his home here. Mr. Stoll expects to return to his office for part-time work later this month and to resume his full duties in the spring.

HOPE
VERTICAL
GAS ENGINES

3 and 4 CYLINDERS — 60 to 250 H.P.

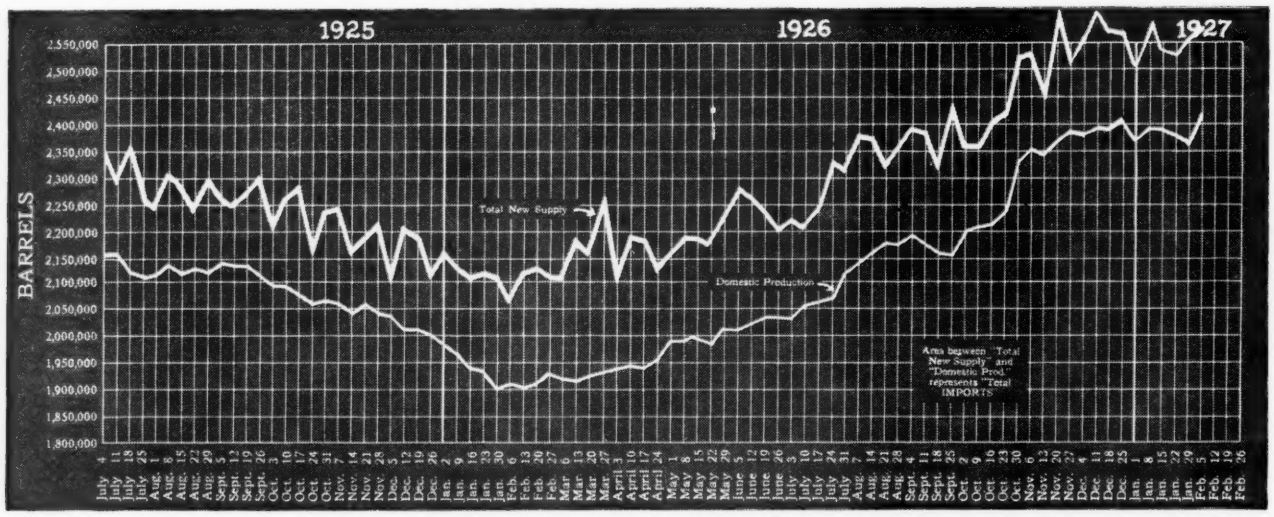


HOPE standards, which admit no compromise with quality for the sake of a lower price, reveal themselves in the Hope Engine to any competent observer. Its superiorities of design and construction are obvious, under any comparison. And its outstanding value becomes more and more apparent, with the passing of years, under even the hardest service.

Tell us your power requirements and let us discuss economies.

ENGINEERS & CONTRACTORS IN NATURAL GAS AND OIL

Daily Average Crude Oil Production and Imports



Daily average gross output of United States, by fields, for week ending with dates below, as compiled by American Petroleum Institute

Production Summary

	Feb. 5	Jan. 29
Production east of Rockies	1,755,900	1,722,950
Increase		32,950
Total Production in U. S.	2,402,400	2,370,350
Increase		32,050
Crude Oil Imports	166,143	194,000
Decrease		27,857
Total Crude Supply	2,568,543	2,564,350
Increase		4,193

OKLAHOMA

	Feb. 5	Jan. 29
North Braman	8,550	9,050
South Braman	4,200	4,300
Blackwell	4,000	4,100
Hubbard	7,150	7,150
Thomas	1,750	1,800
Tonkawa	25,500	25,350
Garber	18,800	18,800
Burbank	47,550	47,850
Osage, outside Burbank	35,250	36,050
Watchorn	2,700	2,700
Cushing	21,250	21,400
Yale Jennings	12,300	12,400
Davenport	4,050	3,950
Bristow-Slick	27,350	27,400
North Okmulgee	17,000	17,200
Lyons-Deaner	4,450	4,400
Stroud	1,650	1,650
Cromwell	13,250	13,400
Papoose	7,650	7,850
Wewoka	20,000	21,200
Seminole	226,000	195,400
Duncan district	6,850	7,050
Graham	9,000	9,000
Fox	1,900	1,950
Healdton	15,000	15,000
Scholem Alechem	12,950	11,700
Hewitt	10,400	10,400
Earlsboro	9,050	9,100
Others	61,750	59,650
Total Oklahoma	637,300	607,250
Increase		30,050

KANSAS

	Feb. 5	Jan. 29
Greenwood County	43,000	43,600
Florence-Covert	1,900	1,950
Peabody-Elbing	3,850	3,900
Eldorado-Towanda	13,300	13,250
Augusta-Fox-Bush	4,700	4,800
Rainbow Bend	2,900	3,100
Russell	3,600	3,650
Churchill	13,500	12,500
Others	28,750	29,000
Total Kansas	115,500	115,750
Decrease		250

NORTH LOUISIANA

Homer	5,250	5,250
Haynesville	8,400	8,350
Caddo, light	10,400	10,100
Caddo, heavy	3,550	3,800
De Soto, Red River	3,950	3,900
Elm Grove	650	600
Bellevue	1,550	1,550
Cotton Valley	6,550	6,550
Urania	12,950	13,250
Total North Louisiana	53,250	53,350
Decrease		100

ARKANSAS

	Feb. 5	Jan. 29
El Dorado	6,200	6,150
Smackover, light	11,950	12,050
Smackover, heavy	100,950	101,850
Stephens	1,450	1,450
Nevada	1,850	1,850
Lisbon	5,200	5,300
Others	300	300
Total Arkansas	127,900	128,950
Decrease		1,050

TEXAS (OUTSIDE GULF COAST)

Panhandle District:

Hutchinson County	113,400	111,150
Gray County	5,650	5,600
Carson County	8,450	8,900
Wheeler County	1,750	1,750
Others	50	50
Total Panhandle Dist.	129,300	127,450
Increase		1,850

NORTH TEXAS

Burkburnett	14,700	14,700
Electra	15,850	16,050
Iowa Park and K-M-A	4,950	5,000
Wilbarger	14,350	15,150
Archer County	33,850	34,350
Montague-Cook	13,750	13,400
Others	1,050	1,050
Total North Texas	98,500	99,700
Decrease		1,200

WEST CENTRAL TEXAS

Stephens County	10,200	10,350
Eastland-Desdemona	5,850	5,850
Brown County	27,600	22,800
Coleman County	1,750	1,700
Callahan County	6,650	6,300
Shackleford County	14,500	14,600
Young County	9,050	9,150
Throckmorton County	4,250	4,250
Palo Pinto County	2,700	450
Jones County	3,650	2,150
Mitchell-Scurry Counties	2,200	3,850
Howard County	2,300	2,300
Reagan County	28,100	28,750
Crane & Upton Counties	36,200	31,300
Others	3,650	3,200
Total West Cen. Tex	158,650	147,000
Increase		10,350

East Central Texas

Mexia	11,700	11,700
Currie	750	700
Richland	1,400	1,400
Wortham	5,200	5,700
Corsicana-Powell	21,850	22,400
Nigger Creek	6,750	8,100
Total East Central Tex.	47,650	50,000
Decrease		2,350

Southwest Texas

Luling	17,850	17,800
Lytton Springs	2,850	2,850
Somerset	1,850	1,900
Laredo District	15,350	15,600
Piedras Pintas	200	300
Others	700	700
Total Southwest Tex.	38,800	39,150
Decrease		350
Total Texas (Outside Gulf Coast)	472,900	463,300
Increase		9,600

GULF COAST

Coastal Texas

	Feb. 5	Jan. 29
West Columbia	10,750	11,300
Damon Mound	1,050	950
Big Creek	2,200	2,150
Boling	2,200	2,350
Blue Ridge	1,900	2,700
Pierce Junction	8,050	6,350
Humble	4,300	4,300
Goose Creek	8,050	7,950
South Liberty	4,450	4,450
Hull	17,850	17,600
Saratoga	1,150	1,150
Batson	1,600	1,600
Sour Lake	5,200	4,800
Spindletop	69,300	70,100
Orange County	5,450	6,500
Others	3,300	3,400
Total Coastal Texas	146,800	147,650
Decrease		850

Coastal Louisiana

Vinton	5,800	5,800
Lockport	3,050	3,250
Evangeline	1,200	1,200
Edgerly	550	600
Others	1,650	1,650
Total Coastal Louisiana	12,250	12,500
Decrease		250
Total Gulf Coast	159,050	160,150
Decrease		1,100

ROCKY MOUNTAIN

Wyoming

Salt Creek	42,000	47,200
Grass Creek	2,750	2,650
Elk Basin	650	700
Big Muddy	2,950	2,750
Lost Soldier	3,850	3,900
Rock River	2,950	2,700
Lance Creek	750	750
Teapot Dome	1,050	600
Others	1,350	1,450
Total Wyoming	58,300	62,700
Decrease		4,400

Montana

Cat Creek	2,350	2,400
Sunburst	10,000	10,000
Others	200	150
Total Montana	12,550	12,550

Colorado

Moffat (Craig)	2,650	2,700
Fort Collins	4,000	4,050
Florence	400	450
Others	350	550
Total Colorado	7,400	7,750
Decrease		350

"Every grade of crude is now a potential source of gasoline. Fuel oil is now a competitor of crude as a base for gasoline. Cracking has doubled our potential gasoline resources," *comments the Oil and Gas Journal, editorially*

Were it not for the Dubbs Cracking Process such statements could not be made

Only the Dubbs Process will commercially crack every grade of crude, topped crude and every sub-fraction of fuel oil – yes, and even residuum, or pitch when liquefied by heating

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Owner of the Dubbs Process
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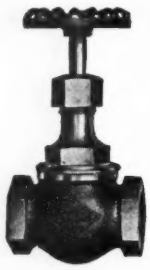

Fig. 106
Screwed, Jenkins Standard Bronze Globe Valve

Fig. 108
Screwed Jenkins Standard Bronze Angle Valve

Strong valves and strong convictions

Strength where strength is needed is a feature of the construction of a Jenkins Valve of any type. The Jenkins "Diamond" signifies first of all a *strong* valve, built for years of trouble-free service.

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Fine Clays Stopped Short

FINE clays always used to be the stumbling block in commercializing the contact process. But they need be so no longer.

We'll be glad to send you a list of refineries now using the contact process.

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New Mexico	Feb. 5	Jan. 29
Artesia	2,000	2,000
Hogback	900	850
Table Mesa	150	100
Rattlesnake	1,700	750
Total New Mexico	4,750	3,700
Increase		1,050
Total Rocky Mountain	83,000	86,700
Decrease		3,700
CALIFORNIA		
Santa Fe Springs	45,500	45,500
Long Beach	93,000	93,000
Huntington Beach	89,000	90,000
Torrance	25,000	25,000
Dominguez	19,000	18,500
Rosecrans	12,500	12,500
Inglewood	38,000	38,500
Midway-Sunset	90,500	90,500
Ventura Avenue	50,100	51,700
Seal Beach	11,900	10,200
Others	172,000	172,000
Total California	646,500	647,400
Decrease		900
EASTERN (Including Ill., Ind., Ky., Ohio, W. Va., Pa., and N. Y.	107,000	107,500
Decrease		500

Nicholas Denies Fourth of Jobbers Fail

CHICAGO, Feb. 5.—A fourth of the Independent oil jobbers do not fail in business!

So asserts L. V. Nicholas, president of the National Petroleum Marketers Association, in a postcard note to members of his organization. It is his reply to a story being circulated before state oil associations that a quarter of the Independent distributors fall by the wayside.

Mr. Nicholas was emphatic this week in his denial of the truthfulness of the percentage figure of failures. He wrote:

"The story is being circulated that one out of every four Independents fail.

"Is this true?—No! Then why is the story being circulated? Who is back of the propaganda and why?

"You are invited to attend our spring industrial house cleaning, Congress Hotel, Chicago, March 8, 9, 10. Railroad fares all reduced."

The topic for the N. P. M. A. convention, "Industrial House Cleaning," will cover the elimination of overhead wastes and the operation of the jobbers' businesses during 1927 with the lowest possible expenditures that accord with sound practices.

Will Exhibit Barber Products

MINNEAPOLIS, MINN.—An exhibit booth is being used during the week of Feb. 5 to 12 by the Petroleum Service Co. here at the Twin City automobile show. The company is distributor of W. H. Barber Co.'s Fyre-Drop gasoline and Penno motor oils in the twin cities.

Oil Man Visits Europe

CHICAGO, Feb. 4.—R. T. Jacklin, Illinois representative of the W. H. Barber Co., Chicago, recently began a 90-day leave of absence to tour Europe. Charles A. Eckert is representing the company in the Illinois territory.

EL DORADO, ARK., Feb. 8.—The Lion Oil & Refining Co. is moving its offices here to the newly built Exchange building. The company will occupy the entire seventh floor of the new building.

Cimarron County Well Swabs 75 Barrels Seminole 241,000 Barrels Daily

By A. F. Hinton
N. P. N. Staff Writer

TULSA, Feb. 5

SEMINOLE soared to new heights in production during the past week, and continued to be the biggest thing on the country's petroleum map, but for once it was forced to share attention with another locality. The well that made Seminole move over and give up a little of the spot light was the Oklahoma Panhandle wildcat test of the Ramsey brothers, Oklahoma City operators.

While apparently not so much of a well as it stands, from a production standpoint, this Cimarron county showing is a most important one. It is more than 100 miles from the nearest production, and, if completed for a commercial producer, opens up a vast territory to be added to Oklahoma's possible oil reserves. The memory of what happened in the Texas Panhandle is too fresh in the minds of the industry for it to refuse to visualize another great field springing up from this remote wildcat.

The Ramsey well, which is in the center of the NW NE of 27-5-5E, is now showing for about 75 barrels daily on the swab. It found the pay horizon at 4095 feet. It has been drilled six feet into this formation, two feet at one time and four feet at another, and its total depth is now 4101 feet.

ALTHOUGH it had but little gas when the oil was first found in the hole, reports are that the gas increased considerably with deeper drilling, although its amount still has not been ascertained. Oil rises in the hole at the rate of 160 feet an hour at present and the well swabs about three barrels an hour.

The oil is of about 38 degrees gravity, and is dark in color. Apparently it is quite similar to Amarillo crude, not only as to gravity and color, but also as to high congealing temperature. Another feature making this well resemble Texas Panhandle conditions is that the last deepening brought out samples of formation that contained a considerable portion of granite wash. The original oil wells in the Texas Panhandle field were completed in granite wash, and this formation is still the chief source of oil in Carson county, south of the main Hutchinson county field. The latter produces from lime.

Although reports have been spread to the contrary, the Ramsey well has made no water and is producing clean oil. It probably will not be drilled much deeper for the present, but will be given a shot, as it is in a hard formation which may yield much more oil after the nitroglycerine has done its work.

IF this test is completed for a good well, it will represent the realization of the dream of all wildcatters, which is that of finding oil in the center of a big block of acreage. The first well at Rainbow Bend, Kans., was one of those dreamed-of wildcats, as it was in the center of about 3300 acres owned by one partnership.

The Cimarron county well, however, has this one beaten by a large majority, as it rears its lonesome crown block in the middle of a young empire of 210,000 acres of leases belonging to the Ramseys.

If this land were in the form of a square, it would be about 18 miles to a side, and, if the well were in the center of it, no others could get within nine miles of it. Room enough on that block for quite a sizeable oil field, and a wonderful opportunity to try unit development.

In addition to the discovery well, five other wells are drilling in Cimarron county, which is the farthest west of the three counties forming the Oklahoma Panhandle. In the old days, this strip, about 65 miles north and south by 167 miles east and west, was disputed territory claimed by both Texas and Oklahoma. During this period it was known as "No Man's Land" and was for a long time the refuge of criminals evading the law from all over the southwest. It has long since out-lived this reputation, however, and is now a typical western farming and ranching country. When the strip was surveyed, its west line was marked as the Cimarron Meridian, all townships being numbered east from this line and north from the base line which divides Oklahoma from Texas.

JAKE G. PHILLIPS, individual operator of Skiatook, Okla., who has been very successful in the Amarillo field, is drilling in 24-6-2, Cimarron county, just a mile and a half south of the Colorado state line. This well, in the NWc of the section is down 300 feet. Sinclair Oil & Gas Co. has a rig up for a test in the NWc of 22-5-2, about 15 miles west of the Ramsey well. The Ramseys are drilling their No. 2 School, in the SEc of 4-5-6, two miles south and five miles east of the well that is showing oil. This well was spudded last week.

Gladys Belle Oil Co. is shut down at 625 feet in its No. 1 Israel, in the SWc NE of 25-3-7, about 30 miles southeast of the Ramsey well. Fenton, Brookins & Flowers have spudded and shut down in their No. 1 Smaltz, in the SWc NE NE of 2-2-9, a mile and a half west of

Drilling Operations in Oklahoma, Kansas and Texas

	Feb. 5 — Week Ended					Jan. 29				
OKLAHOMA	**Loc.**	**Rigs**	**Drg.**	**S.D.**	**Total**	**Loc.**	**Rigs**	**Drg.**	**S.D.**	**Total**
Burbank	5	7	30	...	42	6	11	31	1	49
Other Osage	10	12	128	2	52	17	11	27	2	57
Bristow-Cushing	10	12	105	9	136	11	13	104	8	136
North Oklahoma	8	21	104	45	178	7	17	107	46	177
South Oklahoma	23	21	201	35	280	19	22	172	24	237
Muskogee	...	13	32	27	72	...	11	40	19	70
Okmulgee-Bristow	4	63	121	27	215	5	56	138	17	216
Tonkawa	1	...	1	5	7	1	...	4	4	9
Seminole Dist.	45	97	430	37	609	44	111	429	20	604
Total Oklahoma	106	245	1052	187	1591	110	252	1052	141	1555
KANSAS	71	74	221	101	467	65	77	220	92	454
TEXAS										
C-E Texas	...	127	286	156	568	...	128	282	167	577
Panhandle	...	182	272	79	533	...	184	272	78	533
N.-C. Texas	...	46	99	29	174	...	54	97	33	184
West Texas	...	91	175	47	313	...	90	140	42	272
Total Texas	...	446	832	310	1588	...	456	790	320	1566
GRAND TOTAL	177	766	2105	598	3646	174	785	2344	553	3575

Drilling Wells, Seminole District, as of Feb. 5, 1927

Field	Locations	Rigs	Less than 2000′	2000′ to 3099′	3100′ to 3700′	Below 3700′	Total
Seminole*	6	24	10	33	35	79	187
Searight**	1	10	10	7	5	13	46
Eight-Six	15	78	32	6	7	1	139
Earlsboro	2	18	19	20	24	7	90
Totals	24	130	71	66	71	100	462

*Seminole includes all of township 9-6, except sections 2, 3, 4 and 10.
**Earlsboro includes all of township 10-6, and sections 2, 3, 4 and 10-9-6.

Completions in Oklahoma, Kansas and New Mexico, Week Ending Feb. 5

OKLAHOMA

Carter County

Company	Well No.	Location	Depth	Initial Prod.
Humble	2	SWc 18-1-3W	2586–2618	277 & 10M
Magnolia	7	NEc SE SE 3-2-3W	2206–3095	285
Atlantic	1	NEc NW NW 11-2-3W	2645–2888	325
Amerada	10	NEc SW NE NW 20-5-1E	1999–2014	75
Amerada	4	NEc NW NE 29-5-1E	1595–1615	35

Creek County

Gled	6	NWc SW NW SW 13-19-8	2901–2922	150
Silurian	13	NEc SE SE 8-18-7E	2536–2570	40
Shaffer et al	2	SWc SE SE 17-17-8	3521–3542	145
Gypsy	21	NEc SW NE 1-18-11	1933–1935	30
Gypsy	22	SWc NW SW NE 1-18-11	2057–2075	50
Savoy	1	SEc NE NE 6-18-12	2250–2260	915
Franchot et al	1	NWc NE 9-14-10	3141–3152	150
Donnelly et al	2	SWc NW SE 20-14-10	2948–2955	75
Slick	1	NEc SE SW 32-14-10	3362–3388	150
Prairie	53	SEc SE SW 5-18-7	T.D.	60
Prairie	3	NEc SW NE 30-14-8	3420–3421	255
Alvard-West	3	CEL NE SW 14-17-8	T.D.3685 OWD	Dry
Transcontinental	2	C SE NW 25-17-8	T.D.3134	Dry
Texas	13	CNL NE SW 1-18-11	T.D.2177	Dry
Bu-Vi-Bar	1	SWc NW NE 16-17-9	T.D.3264	Dry
Jackson-Wise	4	CNL SW SW 20-17-10	T.D.2116	Dry

Garfield County

Sinclair	40	SWc NW 18-22-3W	3029–3054	120
Sinclair	55	CNL S½ NW NW 18-22-3W	3700–3720	205

Grady County

Watchorn	2	NEc NW SE 11-4-8W	T.D.2400	30M
Garvin	1	SWc SE NW 16-3-5W	1741–1746	200
Carter	5	SEc NW SW 35-3-5W	1494–1511	50
Noble et al	4	SEc SE SW 26-5-8W	T.D.2450	27M

Kay County

Comar	4	NWc SE SW 5-28-1W	2362–2771 OWD	245
Comar	1	SEc SW 5-28-1	3455–3512 OWD	376
Gypsy	5	NWc SW 28-25-1W	T.D.4350	60
Gypsy	1	NEc SE 29-25-1W	4374–4383	1100

Okfuskee County

Josey	2	C NE NW 33-12-11	3598–3644	175
Barnsdall	1	NW SE SW 15-10-9	3290–3310	90M
Blakesley	1	SEc SW SE 17-12-10	T.D.3000 OWD	Dry

Okmulgee County

Swindler	4	CEL SE SE 21-13-11	3370–3378	½M

Osage County—Burbank

Phillips	3	SWc SE SW 1-27-5E	2980–3024	100
Phillips	3	SWc SE SE 7-27-6E	2936–2976	100
Kewanee	3	SEc SW SE 34-27-6	2753–2818	1400
Phillips	6	NEc SW SW 21-26-6	2900–2942	250
Skelly	6	NEc SE NW 28-26-6	2939–2987	150

Osage County

Simmons	2	SEc SW SW 30-24-9	2121–2237	30
Kanupp et al	1	NEc NW 28-22-12	T.D.1860	Dry

Pawnee County

Magnolia	4	SWc SE NE 32-20-6	3314–3322	365

Payne County

Hale et al	9	SWc SE 30-18-5	3758–3773 OWD	20

Pottawatomie County

Magnolia	1	NWc SE 11-7-4E	3882–3905	166

Seminole County

Carter	1	SWc 13-9-6E	4183–4200	560
Carter	2	SEc SW SW 13-9-6	4155–4168	500
Carter	1	SWc SE 14-9-6	4033–4067	2510
Amerada	4	SWc NW NE 23-9-6E	3938–3992	1755
Barnsdall	3	SWc SE NW 24-9-6	4104–4151 OWD	625
Barnsdall	6	SWc NW 24-9-6	4125–4165	1147
Carter	4	NWc SW SW 24-9-6	4084–4096	300
Gypsy	5	NWc NE NW 24-9-6	3987–3992	115
Gypsy	7	SWc NW NW 24-9-6	4233–4248	2402
Gypsy	7	NEc NW NE 26-9-6	4163–4165	240
Pure	10	SWc NE SW 26-9-6	4107–4110	1129
Tidal	7	NWc NE NW 26-9-6	4096–4110	550
McCullough	1	NWc SE NE 35-9-6	4115–4142	2420
Sinclair	4	SEc NE NW 35-9-6	4003–4008	1680
Superior	2	NEc SE SW 35-9-6	3990–4008	2186
Superior	4	NWc SE NW 35-9-6	4070–4082	1240
Slick	2	SWc NW NE 35-9-6	4045–4092	1000
Independent	2	NEc NW SE 7-9-8	3243–3268	40
Indep-Amerada	1	SEc SW NE 7-9-8	3245–3272	40

Stephens County

Gant et al	3	NEc NW NE NE 36-1-9W	2179–2195	50

Tulsa County

Hayden	1	SEc NW SW 6-19-10	1985–2008	40
Glidden	2	SEc NE SW 15-19-11	2109–2130	960
Sapulpa Fuel	3	NWc SW SW 32-19-11	1764–1808	25

KANSAS

Butler County

Johnson et al	1	SEc SW NE 8-27-6E	3140–3149	75
Tidal	1	NWc NE SE 12-27-7	2740–2767	50
White Eagle	1	NEc SE 4-28-6E	3075–3086	60
Liggett et al	1	SWc 19-26-8E	T.D.2798	Dry
Allison et al	6	NWc SW NW 3-28-6E	T.D.3090	Dry

Chase County

Empire	6	C SW NW 29-18-7	1102–1105	2½M

Coffey County

Ritchie et al	1	NWc SE 32-21-14	T.D.1880	Dry

Elk County

Gillespie et al	1	NWc SW SE 29-31-11	T.D.2050	Dry
Benge et al	1	C NW SE 12-31-9	1463–1475	¼M
Union Gas	6	NWc NE NE SW 14-31-10	1611–1629	180

Greenwood County

Sinclair	51	C NW SW 20-22-10	2250–2318	125
Skelly	18	SEc SW NW 27-22-11	1873–1953	100
Texas et al	5	NWc SW 4-22-12	1885–1905	30
Davis et al	8	SWc NW SW 34-22-13	1827–1858	15
Texas et al	3	NWc NE SW 16-23-11	1913–1962	100
Texas et al	4	SEc SW 16-23-11	1931–1975	100
Roth-Faurot	10	SEc SW 12-25-8	2382–2448	35
Harwood et al	1	SEc NW 25-25-8	T.D.2444	Dry

Lyon County

McCullough	2	SEc NE NW 25-21-10	2554–2575	500

Marion County

Empire	1	C SE NW 34-17-4E	T.D.2747	Dry

Reno County

Fleeger et al	1	SEc NW 35-23-7W	T.D.4105	Dry

Russell County

Keys	1	SEc SW SE 20-13-15W	T.D.3400	Dry

NEW MEXICO

Eddy County

Empire	2	NWc NE NW 2-18-27E	416– 437	8
Swartz et al	1	NEc SW 5-18-27	1850–1865	25
Compton et al	1	NE NW NW 2-18-27	1604–1624	35

Roosevelt County

Pomroy et al	1	C NW 4-1-30E	T.D.4510	Dry

the Cimarron Texas county line and 11 miles north of the Texas-Oklahoma state line.

Across the state line in Colorado, Jake Phillips is drilling in the SW SE of 26-34-48, Baca county, this being the closest Colorado test to the Ramsey well. South of Cimmarron county, in Dallam county, Tex., Wood & Wood of Tulsa are drilling in the center of the NW of section 19, block 17, C.S.S. lands. This lies just south of T.1-R3E, Okla.

In Texas county, adjoining Cimarron on the east, nine operations are under way. Valerius & Prairie are shut down at contract depth of 4002 feet in their No. 1 Hovey, in the SEc of 32-5-12. This well had a half-million feet of gas from 3940 to 3950 feet. H. F. Wilcox Oil & Gas Co. No. 1 Hovey, in the SEc of 21-4-14, is shut down at 4420 feet after running the five-inch casing to 4235 feet. The same company's No. 1 Zea, in the SWc SE of 28-3-13, is drilling at 3500 feet.

CONNELLY, TRAMMELL & DANNER are shut down at 315 feet in their No. 1 Graves, in the NEc SW SW of 23-2-18. Haley, Garber & Pulse also are shut down in their No. 1 Ellison, in the NWc SE SE of 4-1-12. This well is down to 3505 feet and will be deepened. Dutton & Hill had their rotary rig blown down at their No. 1 Becker, in the center SW 4-1-13. H. & H. Oil Co. is repairing rig at 280 feet in its No. 1 Hitch, in the NEc of 26-1-15.

The Three-Way Oil Co. No. 1 Price, in the SEc NW of 11-1-18, is drilling at 525 feet. Connelly, Trammell & Danner got started on their No. 1 Tansey, in the SEc NW of 5-1-19, but have decided to wait a while. They have spudded and shut down. That completes the list of operations in Cimarron and Texas counties.

Only two wells have been drilled in Cimarron county prior to the operations now in progress, according to E. P. Rothrock, in "Geology of Cimarron County," Bulletin 34 of the Oklahoma Geological Survey. The first well was drilled by the Segregated Oil Co. of Oklahoma City, in the center of 22-4-1. This well is believed to have reached depth of 2037 feet, where a light flow of gas, exhausted in three days, was found.

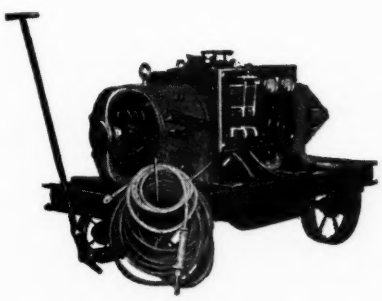
Ramsey Derrick Burned

Staff Telegram

TULSA, Feb. 7.—Through carelessness of a bystander who threw a match or cigaret in the slush pit, the derrick of the Ramsey well in Cimarron county, Oklahoma Panhandle, was burned down. Although a new derrick will be built soon as possible it will probably be a month before work can be resumed on well, as location is remote from supply centers and road conditions difficult. It is the outstanding wildcat development in Oklahoma at present.

(Continued on page 48)

"Say, we need some more of this Wilson Rod!"



The above is a Wilson Type S Single-Operator Motor-Driven Electric Welding Machine—designed for both production and repair work, and adapted for use wherever power is available. Its capacity is 25 to 300 amperes. Other Type S Machines include both single and two-operator units—gasoline-engine-driven, belt-driven and motor-driven—portable and stationary. Capacities: 25 to 250 Amps. 25 to 300 Amps. 25 to 600 Amps.

"YOU know we used a lot of our last supply on that propeller job. And every man in the shop wants to stick to Wilson Wire."

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WILSON WELDER & METALS CO. INC., WILSON BUILDING, HOBOKEN, N. J.

WILSON

WELDING MACHINES AND WELDING WIRE

Completions in N. C., E. & W. Texas & Panhandle, Week Ending Feb. 5

EAST-CENTRAL TEXAS

Brown County

Company	Well Farm	Location Survey	Depth	Initia Prod.
Texas	13-Hickman	Benson	1160–1176	70
Humble	16-Kilgore	Benson	1160–1179	
Humble	11-Hodnott	Harris	1194–1211	75
Wakefield et al	1-Newton	Mitchell	1239–1260	150
Wilson et al	2-Newton	Curlong	1251–1275	25
Amerada	16-Fry	Stubblefield	1274–1294	170
Amerada	16-Fry	Stubblefield	1303–1320	60
Choate et al	8-Lowe	Stubblefield	1280–1299	1200
Henshaw et al	12-Lowe	Stubblefield	1269–1280	1200
Henshaw et al	14-Lowe	Stubblefield	1263–1282	1200
Rex-Pyramid	4-Fry	Stubblefield	1262–1271	480
Texas	12-Hickman	Benson	T.D.1305	Dry
Cosden	4-Arlege	Mitchell	T.D.1605	Dry
McLester et al	1-Whiteside	Bannister	T.D.1368	Dry
Roxana	8-Whiteside	Bannister	T.D.1350	Dry
Shadbolt et al	1-Hall	H&TC	T.D.1205	Dry

Callahan County

Hudson	1-Hudson	Catonett	T.D.2161	Dry

Coleman County

Russell	1-Russell	Martin	T.D.1652	Dry

Eastland County

Applegate et al	2-Cunningham	Epperson	1878–1889	5

Jack County

Sinclair	1-Preston	Sterling	T.D.2095	40
Seaboard	1-Reiley	Stephens	T.D.2501	Dry

Jones County

Marland	3-Mason	TP	2516-T.D.	1500
Mid-West	1-Thornton	TP	2505–2520	720
Phillips	1-Tesse	TP	2523–2527	258
Phillips	2-Winters	TP	2508–2521	700

Mitchell County

Cal	2-Foster	TP	2855–2877	120

Shackelford County

Rosier-Pendleton	25-Cook	ET	1135–1152	143
Rosier-Pendleton	30-Cook	ET	1298–1325	800
Rosier-Pendleton	26-Cook	ET	T.D.1240	Dry
Rosier-Pendleton	28-Cook	ET	T.D.1245	Dry
York et al	1-Mathews	Strades	T.D.1318	Dry

Stephens County

Mook et al	2-Riddle	TP	1963–2030	15M
Mid-Tex	2-Morrison	TEL	3160–3162	2M, 250
Tex-Fidelity	1-Caraway	TP	T.D.2200	Dry
Mook-Tex	6-Head	TP	T.D.1970	Dry
Texas	2-Curry	TEL	T.D.3396	Dry

Throckmorton County

Monroe	1-Richards	TEL	830– 834	3M

PANHANDLE DISTRICT

Carson County

Empire	1-Magnolia	I&GN	3173–3188	112
Roxana	2-Bryan	I&GN	3156–3230	304
Parks et al	1-Noel	I&GN	3167–3168	350

Childress County

Gibson	1-Smith	Gregg	T.D.2590	Dry

Gray County

Texas	1-Holmes	I&GN	3108–3122	15
Constantin et al	1-Dial	H&GN	T.D.2731	Dry

Hartley County

Humble	1-Shelton	Brave	T.D.3076	Dry

Hutchinson County

Rock Island	1-Stares	TC	3033–3140	200
Prairie	1-Cal	H&TC	2719–2732	1032
Gulf	1-Reimer	H&TC	2415–2635	10M
Phillips-Gibson	1-Hagy	Johnson	T.D.2785	39M
Phillips-Elva	5-Whittenberg	Tomlinson	2405–2575	31M
Phillips-Elva	9-Whittenberg	Tomlinson	2733–2768	600
Phillips	1-Johnson	H&TC	2887–2962	631
Phillips	12-Patton	Whitley	2877–2917	350
Skelly	15-Johnson	M&C	2945–2980	216
Hughes	12-Kingsland	M&C	2737–2821	140
Phillips-Finklea	4-Johnson	Whitley	2865–2952	460
Ryan	4-Johnson	Whitley	2950–2980	300
Hughes	2-Kingsland	TC	2779–2839	120
Canadian	1-Johnson	A&B	2895–2985	125

Wheeler County

Cooke-Riley	1-Porter	H&GN	T.D.2500	Dry

NORTH CENTRAL TEXAS

Kruger et al	12-Turberville	Carson	1503–1518	52
Simms	15-Turberville	Carson	1540–1542	100
American	10-Turberville	Carson	1490–1493	25
Kruger et al	1-Wolfe	Miles	1368–1369	75
Sun	2-Green	Livin	1103–1111	5
Kleedon	1-Riggs	SP	T.D.1787	Dry
Brown et al	3-Perkins	Denton	T.D.1801	Dry
Creath et al	1-Lyles	H&W	T.D.1727	Dry
Plains	1-Wilson	ATNC	T.D.1504	Dry

Archer County

Tex-Consol	1-Turberville	Harris	T.D.1525	Dry

Cooke County

Oil Oper	1-Luke	Muenster	1277–1283	75

Montague County

Cato	8-Rolls	Chambliss	867– 875	40
Humble	2-Jones	Donoho	832– 856	35
Texas	31-Rowland	Chambliss	1379–1385	60
Continental	10-Maddox	Thompson	853– 872	60
Continental	11-Maddox	Thompson	852– 872	52
Continental	16-Howard	Thompson	1372–1440	44
Continental	15-Howard	Chambliss	1388–1398	37
Continental	23-Rowland		1054–1082	20
Continental	13-Rowland	Chambliss	1378–1390	23
Continental	10-Rowland	Chambliss	1034–1037	45
Humble	2-Howard	Chambliss	1099–1126	35
Continental	8-Rowland	Votans	1180	Dry

Wilbarger County

Murchison et al	8-Fluman	H&TC	1495–1498	50
Phillips	3-Waggoner	H&TC	1858–1881	140
Phillips	4-Waggoner	H&TC	2370–2404	125
Kelley et al	1-Waggoner	H&TC	T.D.2585	Dry

Wise County

Transcontinental	1-Castleberry	Young	T.D.4570	Dry

Young County

Donoho et al	1-Bernhead	TEL	T.D.1105	Dry

WEST TEXAS

Crane County

Gulf	5-McElroy	GCSD	2643–2687	2500
Gulf	2-McElroy	GCSD	2638–2680	600
Texas	11-King	GCSD	2322-TP	22
Marland	3-Hughes	GCSD	TP-2330	240
Marland	5-Hughes	GCSD	2305–2375	100

Howard County

Magnolia	4-Chalk	W&NW	T.D.1591	56
Magnolia	2-Chalk	W&NW	1642–1660	40
Lockhart	1-Hyman	W&NW	T.D.3320	Dry

Upton County

Gulf	2-Hughes	Teer	2129–2161	80
Marland	3-Shirley	GCSD	TP–2074	168
Marland	4-Shirley	GCSD	2151–2176	52
Roxana	5-Hughes	Teer	2090–2092	140
Gulf	1-Estep	MK&T	2374–2392	84
Gulf	2-Estep	MK&T	2378–2380	112
Rio Grande	1-Chaney	MK&T	2397–2399	25
Marland	9-Estep	Teer	2403–2410	150
Tex-Pac	1-Lane	GCSF	2150–2209	200
Marland	1-Burleson	GCSF	2035–2130	56
Wentz	3-Sherk	MK&T	T.D.2370	Dry

Completions in North Louisiana and Arkansas, Week Ending Feb. 3

LOUISIANA

Caddo Parish—Caddo District

Company	Well	Location	Depth	Yield
Empire Gas & Fuel Co.	Caddo Levee Bd. No. 1	36–21–16	2222	35
Magnolia Pet. Co.	Raines No. 25	22–21–15	1660	20
Woodley Pet. Co.	Muslow Oil Co. No. 2	32–21–15	1691	20
J. W. Burton	Caldwell No. 6	18–21–15	1060	10
Dixie Oil Co. (Standard of Ind.)	Fannie Noel C-1	15–20–15	2445	dry aband.

Caddo Parish—Waskom

Owl Oil Co.	Florsheim No. 3	9–17–16	2555	6 m. ft. gas

Cotton Valley—Webster Parish

Ohio Oil Co.	Pickett No. 1	30–23– 9	2658	10 m. ft. gas

Jackson Parish—Jonesboro

El Dorado Chief Oil Co.	Jones No. 1	3–14–4W	3557	s.w.aband.

Grant Parish—Emden District

Company	Well	Location	Depth	Yield
Tunica Pet. Co.	L. & A. No. 22	16– 8–3W	1885	dry aband.

ARKANSAS

Ouachita County—Heine District

Seagreaves & Moody	Moline Lbr. Co. No. 1	8–11–17	2003	dry aband.

Stephens

Buffalo Oil Co.	Culp No. 2	22–15–19	2211	25

Lisbon

Lion O. & R. Co.	Werner No. 7	28–17–16	2167	10

Smackover

Ramage et al	Lawton C-10	10–16–15	2020	50
Roxana Pet. Co.	Flenniken B-5	5–16–15	2370	125
Weiss & Simmons	McElroy No. 1	4–16–15	2698	20

Texas Fields Yield 166,696,217 Bbls., In 1926; Looks Into Future

HOUSTON, Feb. 5

SURVEYS made by R. B. Whitehead, chief geologist of the Atlantic Oil Producing Co., Dallas, and Sidney A. Judson of the Humphreys Corp., Houston, for the February meeting of the American Institute of Mining and Metallurgical Engineers at New York City show that Texas production in 1926 approximated 166,696,217 barrels of crude petroleum.

Whitehead estimated that Texas produced 123,500,000 barrels in areas outside the Gulf coastal region. Judson credited Gulf coastal Texas with 43,196,217 barrels. The foregoing figures do not include 5,689,298 barrels accredited to the Louisiana division of the Gulf Coastal Saline dome province.

Chairman F. Julius Fohs of the Petroleum Division of the A. I. M. M. E. has authorized publication of the summaries made by Messrs. Whitehead and Judson, excerpts from which follow.

For lack of a better classification, Whitehead divided Texas territory outside the Gulf Coast into the following general areas: north central Texas, Texas Panhandle, central Texas, Balcones fault line system, west Texas and southwest Texas. Regarding developments he said:

"IN the north central Texas area which includes the following counties, Wichita, Archer, Young, Wilbarger, Jack, Throckmorton, Cooke and Montague, 12 new pools have been discovered during 1926. The oil from these pools is for the most part coming from the Cisco series at shallow depths.

"The general trend of activities in north central Texas has been directed southward into southern Archer and northern Young counties for the most part. During the early summer activities were at a height in Wilbarger county where a major trend between the Vernon and Electra Pools were given considerable attention. Activities starting the year 1927 are centered in southern Archer and northern Young counties, with Jack and Throckmorton counties being given serious consideration.

"The producing possibilities in Cooke and Montague counties have been accentuated during the year by the bringing in of the Bulcher pool in northern Cooke county and it is possible that a production pattern similar to the present one in southern Archer county may be developed in Cooke and Montague counties in the near future.

"In the Panhandle district of Texas three new areas have been developed to the eastward from the original center of production for 1926. The Pampa producing area in Gray county is probably one of the striking examples of this eastward trend of development. Two types or zones of production are being developed in the Panhandle area, viz., from a lime series and granite wash. These two zones parallel each other and flank the gas producing area. Panhandle production has averaged over 100,000 barrels daily since June to the close of the year, with as many as 575 wells drilling at one time.

"IN central Texas, including the area in and around Stephens and Eastland counties the deep sand, known as the Ranger sand, has been developed in two localities where sizable wells have been developed, which are probably forerunners of Ranger sand pools which should compare favorably with the present areas from which Ranger sand oil is being produced.

"The Balcones fault line system, which includes the Luling district as well as the Mexia-Powell pools, has been comparatively dormant during the year. Seventy wells were drilled north of Luling along several fault lines in search for another Luling Pool. This development extended well into Bastrop county, but the close of the year revealed no new pools or gave much hope for the discovery of another pool similar to Luling either north or south of the present producing area.

"In the Mexia-Powell fault zone, the Nigger Creek field has been the only new pool discovered in the Woodbine sand during 1926. This pool is located on a parallel fault line to the present producing Mexia-Powell fault and has renewed the interest of operators in endeavoring to discover another Woodbine pool west of the present line of production and parallel with the same. The Nigger Creek pool has been defined and is to be compared in importance with the Richland field of this group. The year 1926 has seen the starting of four deep tests to the Trinity sand below the Woodbine where production can be expected at a depth of approximately 5000 feet. These tests are well positioned with reference to the fault line and will serve as regional tests from Kosse to Powell.

"IN west central Texas, which includes Brown, Coleman, Callahan, Eastland and Shackelford counties, nine new pools have been discovered during the year. Brown county is leading this group, with three new discoveries. Production is coming from the Cisco and Strawn sands and the year closed with the center of activities located along the county line between Brown and Coleman counties where sizable quantities of high gravity oil are being produced from a depth averaging 1350 feet. The prospects are very good for the development of several more of these high gravity shallow pools during the coming year.

"West and southwest Texas, including Crane, Upton, Reagan, Winkler, and Jones counties, has been in the limelight during 1926. Here several new pools have been developed during the year which for the most part are producing from the Big Lime series of west Texas similar to the producing horizon in the Big Lake pool. None of these pools has been defined by the close of the year, but are considered to be the forerunners of sizable producing areas. These pools are being developed on major structural trends which trend in general in a northwest-southwest direction somewhat parallel to the Panhandle trend of production.

"The opening up of a field in southwestern Jones county at a depth of 2500 feet from the Cisco series can be considered as filling the gap on the production map between the typical Cisco-Strawn production of west Texas, located in Brown and Coleman counties, and the typically southwest Texas lime production, the latter being found on trends adjacent to the periphery of the west Texas basin. In other words, moving westward from the Bend Arch, we first encounter the Bend Lime-Caddo production, west of which is located the present Cisco-Strawn sand production and further down dip, possibly midway between the west Texas basin and the crest of the Bend Arch, we find this new pool in Jones county which obviously opens up a vast territory of possibilities and a zone several miles wide running in a general north and south direction.

"IN extreme west-southwest Texas regional trends are being developed adjacent to the Davis Mountains, this area having received some attention during 1926, but will probably be considered more important during the coming year. These major trends have all the necessary prerequisites to produce fields comparable with those developed southwest of the Arbuckle Mountains of Oklahoma.

"The year 1927 will probably see several regional trends explored which are known to exist south of the present Panhandle trend of production. It is very likely that the south flank of the present producing Panhandle trend will be developed during 1927 with successful results. Of these two regional trends running parallel to the Panhandle trend are now receiving the attention of the major operators.

"In southwest Texas, the most important development of the year was the Randado pool. This pool is now about two miles in length, and most of the development has been made during the present year.

"The Bruni, a small oil pool, was developed on the east flank of this former gas field. The gas field itself was ex-

tended to the north. Ohern and Secord, also the Associated Oil Co. discovered separate gas areas about three and four miles to the south of this pool, but as yet these have not been much developed. Simms Oil Corp., drilling on the Dinn ranch about four miles north of the Bruni gas field, obtained a gas well. This area is not yet developed. Oil was discovered in the Carolina-Texas gas field by the Associated Oil, but no worth while extensions were obtained.

"Alworth, drilling in Section 39 nearly five miles south and slightly west of the Randado pool, obtained a well, making about three million gas and some oil. This looks like a new pool but has not yet been developed.

"THE Panhandle, west and southwest Texas areas should receive the greater part of the attention of Texas operators during 1927. Some prophecies have been made relative to the potentialities of this country, all of which are probably low at this time, but the writer can conscientiously calculate from the present proven areas in this territory that there is at least a reserve of three billion barrels of oil in the Panhandle and Big Lime producing areas of West Texas. This will give the north side of the Panhandle trend a reserve of eight hundred million barrels.

"With the development of Cisco production in Jones county, it is very probable that the Strawn sands will be sought for at comparable depths in north central Texas as well as the further searching for Cisco production at greater depths."

Regarding Gulf Coastal Texas and Louisiana 1926 results were summed up by Judson as follows:

"The year of 1926 opened with Boling, Piedras Pintas, Spindle Top and Pierce Junction appearing as probable sources of flush production. Of these Pierce Junction and Boling secured noteworthy development. However, it remained for Spindle Top to develop a field of first magnitude and raise the Gulf coast yearly output beyond any point reached in its history.

"The year has seen the discovery of four salt domes, all of which were located as a result of a vigorous geophysical campaign covering practically all of the remaining territory in which domes were already known.

"Important discoveries of oil on new flanks of old domes have been made and these have been developed into small pools in a systematic manner. This development has been aided by improved equipment and methods which has enabled operators to test more efficiently all possible oil strata. These improvements have also encouraged producers to carry a greater number of tests deeper than heretofore, with the result of finding several deeper pays.

"THE Gulf coast production by the end of the first three or four months of 1927 should have lessened considerably in amount and be gradually approaching its average level of the past five years, on account of the probable decline of flush production at Spindle Top. Of course, Spindle Top may possibly continue its output by discovery of deeper sands or extensions, or other fields may develop a quick flush; nevertheless, it is more probable that the Gulf Coast production will be mainly sustained by the output of a large number of small fields.

"It is probable that geophysical work for 1927 will consist mainly of reconnaissance, principally by seismograph, in regions extending well beyond the known salt domes. Search by detail, work for fields of structural type and for very deep salt domes will be given attention. Known domes will be detailed with increased accuracy.

"No estimate is hazarded as to the number of domes that will be discovered by geophysical methods, yet it is believed that the discoveries of 1927 will not greatly influence the production figures for the Gulf Coast for the present year.

"It is probable that new drilling operations will be largely confined to developing flank production on salt domes. Rapid development may be expected only where productive acreage is cut up into small tracts. However, nearly 50 per cent of the domes are held in fairly large tracts, and accordingly on these domes development can be carried on with sufficient care to permit efficient operation and to aid in preventing overproduction."

Cimarron County Well Swabs 75 Barrels

(Continued from page 44)

Drilling was stopped on account of financial difficulties, the bulletin says.

THE second well was drilled by the Empire Gas & Fuel Co. in the SWc NW of 22-5-5, in the section north of the new Ramsey well. This well went to 1580 feet. Rothrock says "legal difficulties compelled the company to stop drilling. No show of oil or gas was found here, but depth of the well was hardly sufficient to be a test of the structure, for even though the top of the hole was but a short distance above top of the red beds, it is probable the well did not go through this formation."

THE Seminole area at end of the week was at a new high figure in production, the four pools showing a total of 241,725 barrels for the past 24 hours. This was obtained from 214 wells, of which about 40 are in sands other than the Wilcox. Production was distributed by fields as follows:

Field	No. Wells	Production
Seminole	183	192,745
Searight	18	28,964
Earlsboro	11	9,185
Bowlegs (8-6)	2	10,831
Total	214	241,725

Analysis shows that there are 462 operations under way in the Greater Seminole district, of which 100 are below 3700 feet in depth, and which should be completed within two or three weeks. Of these deep wells, 79 are in Seminole proper, 13 are in Searight, one is in Eight-Six, and seven are in Earlsboro. The entire area is mud-bound, making it almost an impossibility to move material. This is slowing down drilling and delaying completion of many wells that would have been in by this time. In spite of difficulties, however, the field has continued to increase its production, setting a new high figure each week.

Production in the Texas Panhandle the past week was 127,184 barrels daily, from 909 wells. This was an increase of 400 barrels and 20 wells over figures for the preceding week. Developments in that district were of a routine nature during the week.

Well Shows New Field In Louisiana

HOUSTON, Feb. 7.—Arkansas Fuel Co. Feb. 3 drilled in the discovery well of a new Louisiana field under ideal conditions affecting marketability of its crude. The well, in 33-10-12, northern Sabine parish, made 513 barrels at total depth of 3209 feet the first 24 hours, flowing by heads at intervals of about one hour.

It is also about six miles south of west of the Sodus pump station on the Standard's trunk pipe line from north Louisiana to Baton Rouge. Pipe lines of the Texas and Gulf companies also serve the old Desoto-Red River producing areas about 15 miles north.

Three more locations have been made by Arkansas Fuel Co. on acreage blocked by C. W. Robinson of Shreveport and A. A. Fair of Mansfield for immediate drilling in the area of the Logan farm discovery.

Other tests are proposed by operators holding nearby acreage in what is known as the Pleasant Hill community. The area is reached via Texas & Pacific railroad, which touches the towns of Sodus and Pleasant Hill on the east and the Kansas City Southern Railroad which touches Converse six miles to the southwest.

Drilling in northern Sabine parish over about 12 years had previously resulted in the finding of only showings or small wells making from 10 to 20 barrels daily. These were not considered commercial producers because of deep drilling depths. Now a fresh search for paying quantities of crude will follow the Arkansas Fuel Co.'s discovery.

View of the three tanks at the Standard of New Jersey at Glenburnie, Md. station, described in the accompanying story

Modern Large and Small Bulk Stations, How They Should be Built

By H. L. Shoemaker
Engineer, Standard Oil Co. of New Jersey
Written Exclusively for National Petroleum News

MODERN bulk distribution stations are essential to the industry to facilitate the economical delivery to the consumer of finished petroleum products. They are located at strategic points relative to the market where deliveries are made in small quantities and to the source of supply where stocks are received in bulk by tank car or barge.

In addition to selecting the most desirable site for the station, it is also important that the design and construction of the station itself be correct if the desired results are to be secured. It is the purpose of this article to discuss the latter part of this problem having to do with correct design and construction of the station which results in efficiency and safety assuring economy in operation.

We will first discuss the more important principles of design, such as fire and accident prevention and economy of plant construction and operation, which principles are observed by this company in the building of both large and small stations. We will then describe briefly a typical large station, such as the one at Jersey City, N. J., and a small station, such as the one at Glenburnie, Md.

Fire Prevention

IN bulk station construction, as in refinery construction, fire prevention is given every consideration and among the more important points to observe is the avoidance of congestion in the spacing of buildings, tanks, etc. Spacing of tankage is particularly important.

The standards of the National Fire Protection Association, as regards spacing of tanks containing flammable liquid from each other and from adjacent property lines, are observed, as well as the regulations of the Bureau of Explosives with regard to the spacing of tankage and loading racks near railroad right-of-way as set forth by the American Railroad Association.

Vertical storage tanks have been adopted as representing less of a fire hazard than the horizontal, and when used for the storage of gasoline are of vapor proof construction with pressure and vacuum relief valves, and equipped with all necessary gas tight tank accessories.

Fire banks are also provided where a fire hazard would exist if a tank were to be ruptured. The walls are built of earth or concrete and of a capacity equal to that of the tank or tanks enclosed. Earthen walls are used instead of concrete where space permits, due to the lower cost. Where the general topography of the location slopes toward a railroad or other valuable property, an earthen or concrete dike is built around all the tanks as a precautionary measure.

THE type of fire fighting equipment with which the various stations are supplied is governed largely by the size of the station, the value of adjacent property and the possible damage resulting from a fire at the station. In the smaller stations, 2½-gallon hand extinguishers of the foam type are installed in the pump house, warehouse, garages, and filling room, and one quart carbon tetrachloride extinguishers are provided in locations where the foam type of unit would be subject to freezing.

At points where oil fires are not apt to occur, such as offices, stables, etc., 2½-gallon soda-acid extinguishers are provided. Some of the larger stations are equipped with a complete fire foam protection system with all attendant equipment such as foam solution pumps, chemical storage tanks, pipe lines, etc., similar to the type used in oil refineries. Sometimes connections to the city water main with one or more hydrants are made where the proximity of city mains permits of this.

All of the station buildings are constructed of non-combustible material. For small stations in the rural districts the buildings are of structural steel frame work with corrugated pressed steel roof and siding. In the case of the larger stations where there are warehouses, garages, pump houses, and sometimes separate office buildings,

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Tulsa, Okla. Fort Worth, Texas

BULL DOG WELDS THAT HOLD

strictly fire proof construction is used, consisting of reinforced concrete and hollow tile or brick, with steel sash and metal doors.

As a substitute for reinforced concrete, frame work of structural steel is sometimes used. In such cases, the steel is encased in concrete, brick or tile to assure adequate fire resisting construction. Pump houses are given special consideration particularly as to ventilation. They are equipped with ventilators at the floor line as well as the roof and ventilating sash is used throughout.

The operators are required to keep the doors and windows open when pumps are in operation. Where electric motors are used for driving the pumps, it is customary to construct a fire wall between the pump and motor, the pump shaft passing through a stuffing box in the wall.

WHEN gasoline engine driven pumps are used, the dividing wall is not considered necessary. Vapor proof electrical fixtures are used in all pump houses, as well as at loading racks and all other points where a spark might cause an explosion.

Special consideration is given to the elimination of static electricity at the loading racks where it ordinarily seems to be most prevalent. The racks are provided with grounding chains which are laid over the outlet faucets when the trucks are being filled and the outlet connections of the loading racks are designed to make a metal contact with the tank. These precautions prevent the building up of a charge of static electricity that might cause a spark.

Accident Prevention

THE company has for some time been conducting a systematic campaign to reduce the number of accidents at its various plants. The work is under the supervision of a safety inspector with a local representative at each of the larger works. Very encouraging results have been secured and in all new construction advantage is taken of experience gained from this work.

To eliminate features that are not considered desirable from a safety standpoint, the plans of all new construction are reviewed by a safety engineer and revised where necessary to meet with approval, so that when the station is finally erected, it is as far as possible accident proof.

Economy of Plant Operation

THE location of the station provides economical receipt of products in bulk by tank car or barge and the station design must provide for the most efficient and economical handling of the products within the station. All stations are now provided with power pumps as the use of hand pumps for unloading, even at the smaller stations, has been discontinued as being uneconomical. Gasoline engines are generally used as motive power for driving pumps, but in some cases electricity or steam is used. The pumping unit adopted for handling gasoline and kerosene consists of twin rotary pumps, each pump handling a particular grade of oil in order to avoid contamination.

Ordinary steel line pipe, with screw fittings, is used, and the pipe lines are placed above ground where they can easily be inspected. The pipe lines handling the various products are painted in distinctive colors and thoroughly marked so as to indicate the products handled by each line. Ordinarily 2½ inch or 3 inch lines are used, excepting in larger stations, where stocks are received by barge and where the lines must be considerably larger as the barges are equipped with pumps of high capacity.

In laying out driveways it is usual to work to a radius of 30 feet and wherever possible the layout in the station is such that trucks may enter the plant, run directly to the filling rack, and after being filled, leave without having to do any maneuvering.

LOADING or filling racks vary in size from a single truck loader, consisting of suitable platform and loading column, to the more elaborate reinforced concrete and structural steel and corrugated iron structure where six or more trucks may be loaded simultaneously, and where loading lines are provided for several different products. Concrete pavement is always laid at the loading racks so that the trucks will be standing on a level base while being filled. The loading arms are provided with swing joints so that two or three compartment trucks can be filled without moving. Practically all truck filling is done by gravity, excepting where underground tanks are installed and in cases where it is necessary to resort to the use of power pumps to draw on the reserve supply below the gravity level in the vertical tank.

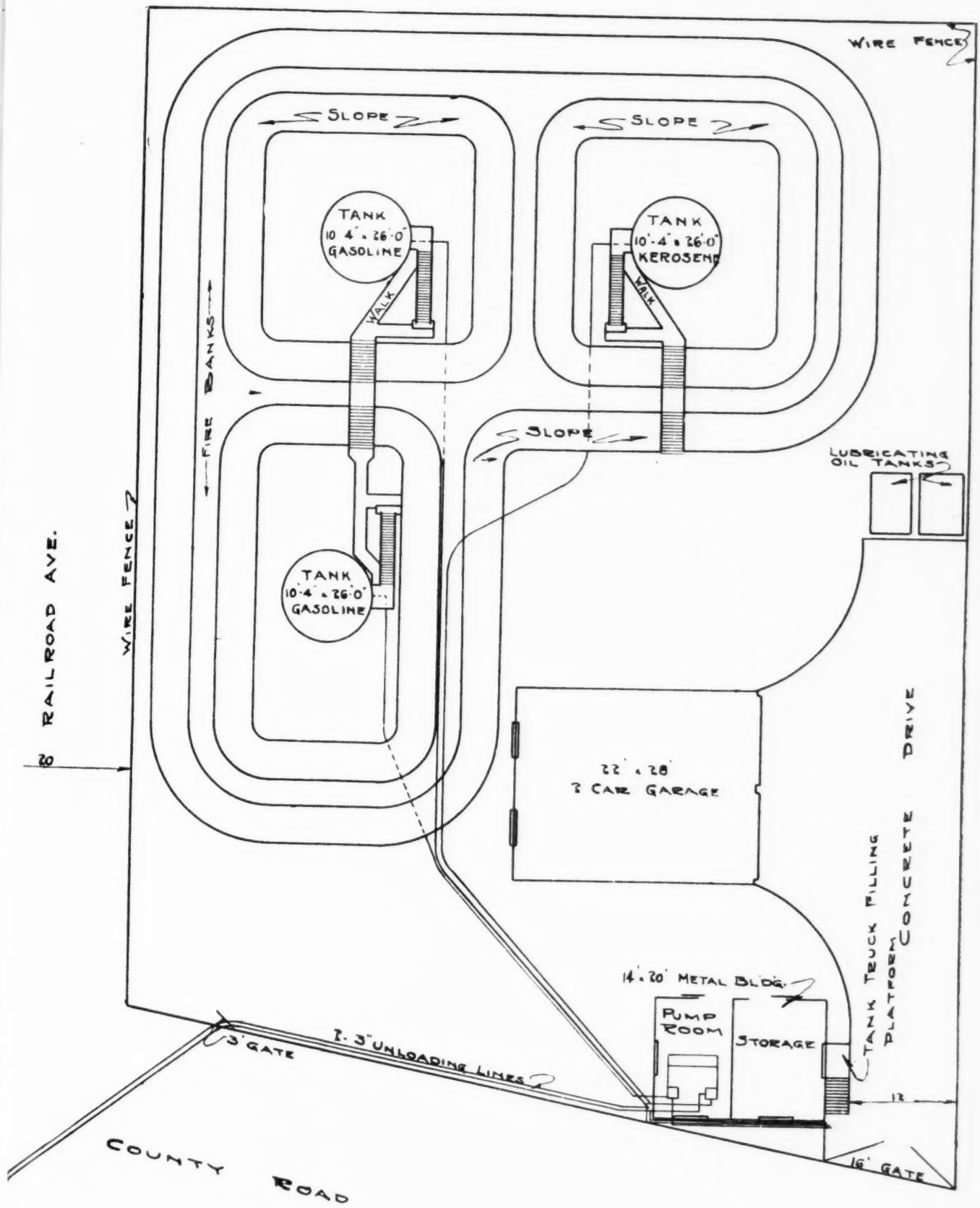
Economy of Construction

AT all stations the company attempts to secure economy of construction by standardization rather than by using inferior materials in the course of construction. For example, a standard vertical tank has been adopted, 10'4" in diameter by 26'0" high, having a capacity of 16,200 gallons. Materials for these tanks are ordered in large quantities so that they may be taken from stock whenever needed for construction of tankage at a new station.

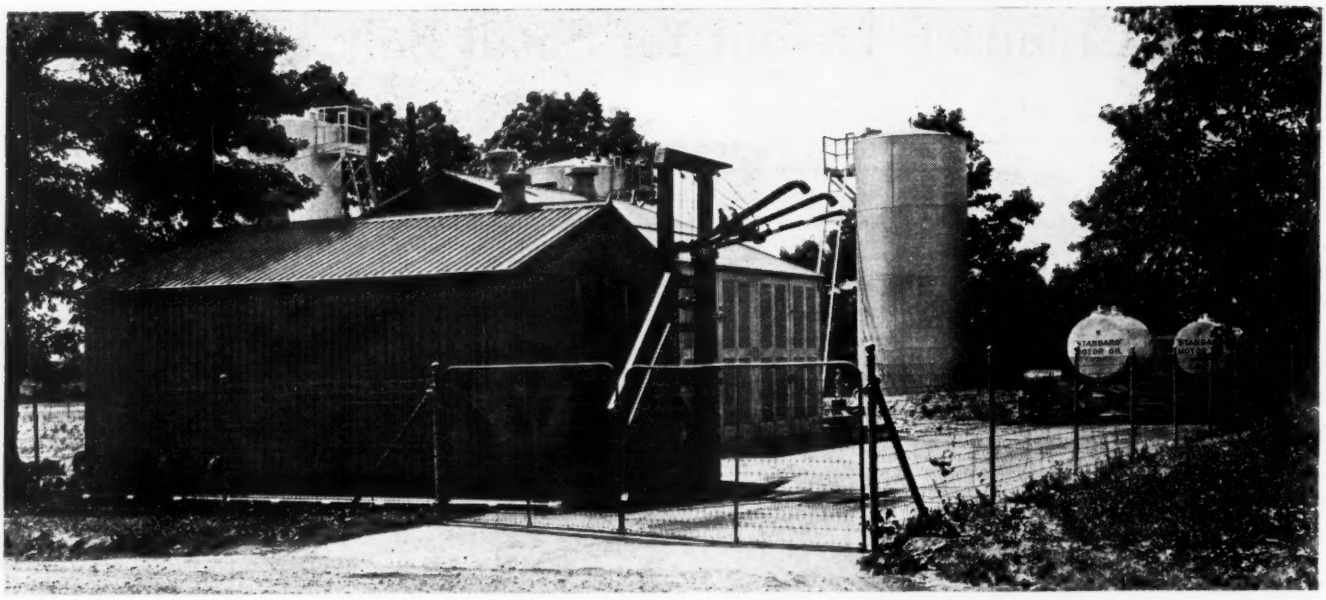
These tanks are generally set directly on the ground, a concrete slab foundation only being used where soil conditions require it. The standardization of metal pump houses, garages and warehouses also permits of prompt delivery at low cost, and the endeavor to make all stations as similar as possible reduces erection cost to a minimum.

Experience indicates that our own forces can build the smaller stations quicker and cheaper than can an outside

A Compact Layout for Small Bulk Station



This three-tank station at Glenburnie, Md., is pointed out by the Standard Oil Co. of New Jersey as one of its typical small bulk plants



View of truck loading rack, garage and lubricating oil tanks at the Glenburnie station of Standard of New Jersey

contractor, as our men are familiar with all details of construction of the standardized units. However, in case of the larger stations, this work is generally done by outside contractors after the securing of competitive bids.

We, however, in all cases, do our own pipe work as we find that the average local contractor or plumber is not familiar with special work attached to making oil lines tight.

Description of Typical Stations

AS a concrete example of the type of construction used by this company, we will describe briefly a small station as erected at Glenburnie, Md., and then the larger station such as the type built at Jersey City and Newark, N. J.

By referring to the plan of the Glenburnie station, it will be seen that there are three of the standard size tanks, two of which are used for storage of gasoline and one for kerosene. In addition, there are two small lubricating oil tanks which are old tank-wagon tanks which have been utilized for this purpose.

Also, there is a standard two-truck metal garage, 14'x20', a metal pump house and storage room, a filling platform, earthen fire banks, concrete walls, piping and a wire fence surrounding the property. All tanks, as is standard practice, are painted with aluminum paint to reduce evaporation losses in the case of gasoline, and for better appearance in the case of other tanks. Each tank, it will be noted, is surrounded by a fire bank which is high enough to contain the entire contents of a full tank. The garage, pump house and warehouse buildings are constructed of galvanized pressed steel sheets over a frame work of structural steel, with floors of concrete, thus making the entire construction as fire proof as possible.

The truck loader is provided with three filling pipes, one for each of the products handled, and the control valves are operated from a small platform. The pumping unit used at this station is the standard double unit driven by a gasoline engine connected through a friction clutch. The piping is arranged so as to take suction from the tank car unloading point, which is about 150' distant from the station, delivering the products to the storage tanks. Gravity loading of trucks is used, but the piping is arranged so that pumps may be used when necessary. The photographs and plans of the station reproduced herewith show clearly the general arrangement.

The Jersey City station is a typical large station. The three story warehouse is approximately 103'x130', the garage 75'x148', the office 41'x82', and the stable 34'x130'. In addition, there is a pump house and a boiler house. All are of fire proof construction, being of reinforced concrete with hollow tile curtain walls. The warehouse is designed to carry two additional stories if the need ever arises for this space.

ALL details of construction, such as steel, sash, wire glass, metal doors, etc., are approved fire proof construction. The tankage at this station consists of 17 vertical tanks of various sizes, the gasoline and refined oil tanks protected by means of reinforced concrete fire walls, extending on two sides of the tanks, the rear being protected by a steep hill.

Shipping and railroad facilities consist of a double railroad siding with unloading connections for eight cars. The sidings are protected from the street by a concrete and hollow tile wall 8' high.

At this station there is a six truck reinforced concrete loading rack. A special loading rack for lubricating oil trucks is also used at this station, being separated from the main loading racks, which are for white products only. The two lower floors of the warehouse are used for storing barrel and case goods, while special products, oil stoves, repair parts, etc. are stored on the top floor. The building is provided with an electric elevator to render all floors readily accessible.

THE Newark, N. J. station is one of the largest bulk stations operated by this company. The type of construction is similar to that referred to previously, the main difference being that the units are considerably larger in size, the largest tank being 45'x42'. The plant has facilities for receiving in bulk both by barge and by tank car, and a twelve truck loading rack. This station is of particular interest on account of the extensive tankage facilities, whereas the special feature of the Jersey City station is the large warehouse.

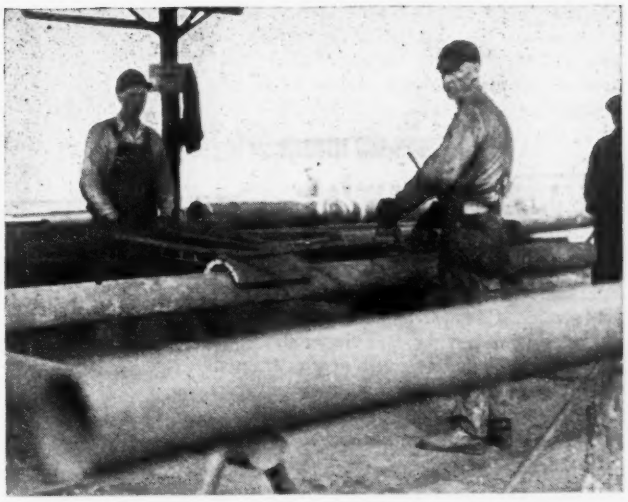
The above general features are applicable to all of the bulk marketing stations as built and operated by this company, and show, we believe, the progress made in recent years in this type of construction, also giving a general picture of the features which it is believed should be incorporated in this type of construction.

UNIONTOWN, PA.—Rogers Gasoline Co. has installed a 20,000 gallon tank to handle ethyl gasoline, which will be marketed under the name Meritol-Ethyl, according to Harry W. Cohen, secretary and treasurer.

CANANDAIGUA, N. Y.—Poole & Burrows, with headquarters here, are Ontario county distributors for Metro gasoline. A. T. Poole is a native of Canandaigua and D. M. Burrows formerly lived at Albion, N. Y

Oklahoma Natural Gas Co. Salvages Old Line Pipe By Heating and Cleaning

By A. F. Hinton
N. P. N. Staff Writer



Scraping line pipe with wire brush, at pipe-treating plant of Oklahoma Natural Gas Co., Tulsa. Pipe has just been removed from furnace.
N. P. N. Staff Photo

TULSA, Feb. 5

REHABILITATION of line pipe is an important item for any company which, in the nature of its business, must frequently lay and take up gathering and field lines, whether for oil or gas. Pipe buried in soil and subject to action of salt water and other reagents is peculiarly susceptible to corrosion.

If corrosive action is not too severe, pipe can be kept in fairly good shape for years if properly covered with suitable surface protection. When taken up, however, it is highly desirable to examine the pipe and to determine by close inspection whether or not it is fit for further use.

When rust has started eating into pipe, it tends to continue doing so even after the pipe has been removed from the ground. Thus, unless pipe is thoroughly cleaned and inspected, it will continue to disintegrate when stacked above ground and will soon become useless. If given proper treatment, however, it can be rehabilitated and in most cases made practically as good as new. This is an especially important problem for gas companies, as they use a great deal of line pipe and must keep their lines gas-tight. Therefore they cannot afford to use second-hand line pipe unless it has been closely inspected and re-conditioned.

Oklahoma Natural Gas Co., which distributes gas throughout Oklahoma, has developed at its Tulsa shops a method of treating used line pipe that has proven profitable and successful. The pipe is put through a process that renders it susceptible to close inspection to see if it is fit for further use, and, if it passes this inspection, puts it in first-class usable condition.

THE principal feature of this pipe treating plant is a gas-fired furnace. Pipe coming in from the field is passed through the furnace and heated to a cherry-red throughout its length. It rests on supports made up of small welded pipe, mounted on rollers on a small track, and is pulled through by a hand-operated winch. Tongs are used to keep the pipe turning while it is making its trip through the furnace, to prevent bending or burning.

Heat in the furnace is sufficient to burn off the paint, asphalt, or whatever protective coating had been applied to the pipe in the field. Heating it to a cherry red also causes a great deal of the scale and rust to fall off. On emerging from the furnace, the pipe is rolled onto skids, also constructed of welded pipe. It is immediately given a thorough cleaning with a heavy wire casting brush, fitted with two long handles, and shaped so that about one-half of the pipe is scraped at one time.

This brush is wielded by two men, who go from one end of the joint to the other and back again as the pipe slowly rolls along the skids. This process cleans the pipe so thoroughly that all imperfections in the metal become easily apparent.

After this scraping, the joint is gone over with wet gunny sacks, made up into a pad on a long handle, similar to an ordinary mop. This removes the iron oxide dust, and the gunny sacks being soaked in a soda solution tend to neutralize any acids that may have formed. By this time the pipe is so well cleaned that all pit holes and other imperfections may be closely examined. The pit holes are cleaned to bottom by the process, so that if they have gone all the way through wall of pipe, they are readily noticed.

INSPECTION is made by the foreman of the pipe-treating shop. If he finds pit holes all the way through, the joint is passed off to one side to be repaired by the welders. If the joint passes inspection it proceeds to the painting vat. Here it is given a thorough covering of black priming coat, the composition of which is recommended by the company whose permanent pipe covering the Oklahoma Natural is using. This priming paint is applied hot, a small gas burner under the vat being used to keep its temperature up.

The pipe also is still hot when it arrives at the painting vat. The paint is heated only enough to cause it to spread easily and to cover the surface quickly. The priming coat is not applied to the ends of the pipe, about three inches being left uncovered at each end. This is explained by the fact that it interferes with getting a tight joint when couplings are used, and also is a nuisance when the line is welded, as heat of the welding arc causes the paint to melt and run off.

The painting is the final step in reconditioning the pipe. After going through this process it is stacked in the yard and is ready for use. The company makes no attempt to grade line pipe other than new and second-hand. Pipe that cannot be made fit for use by re-conditioning is classified as junk, and is either sold or used for construction purposes around the plant.

Only a very few defective joints get by the inspector at the pipe-treating plant. Usually these will be joints which have very small pit holes which he failed to see. Pipe stacked as usable second-hand line pipe will be found entirely serviceable in the vast majority of cases.

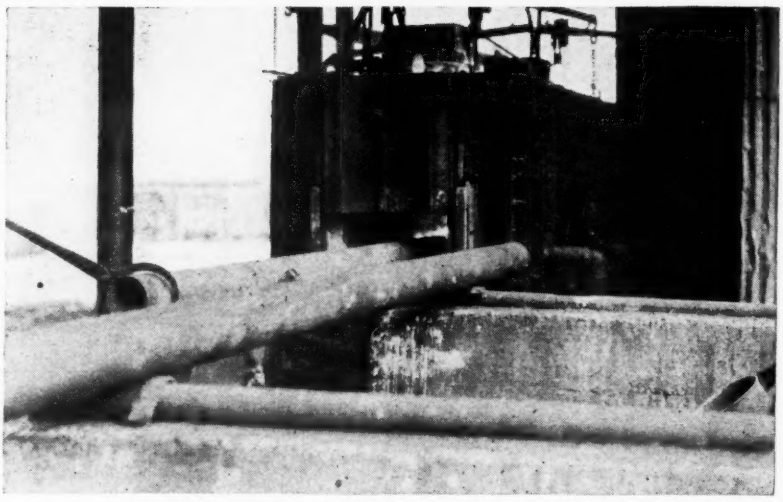
THE pipe furnace is also used for treatment of new line pipe occasionally. The company orders its line pipe with mill lacquer left off, but every now and then it receives a shipment on which this covering has been applied. The lacquer, being of an oil base, interferes with proper application of the priming coat, and is therefore burned off. To accomplish this, the pipe is run through the furnace, but is heated only enough to remove the lacquer, not getting as high a temperature as is used to remove scale from used pipe. New pipe without the lacquer does not go through the furnace.

The pipe-treating plant requires the services of a foreman and five men. The foreman does his share of the work, having in addition the responsibility of inspecting the pipe and of general supervision over the work.

The furnace and all devices for handling pipe were built at the company shops. It was decided that a furnace would be cheaper than a sand-blast,

which is used for the same purpose by some companies, and that it would be just as good. The furnace was constructed of material already at hand. It is made of steel, and is lined with fire brick covered with ½-inch of asbestos cement. When the plant has run the equivalent of nine hours a day for 30 days, the cement has to be replaced. Replacing it requires one man a half-day.

An electric motor is used to operate a blower. Gas is used as fuel in a low-pressure burner. Temperature is regulated only by amount of gas turned on, the pipe being heated to cherry-red as determined by inspection, and no record of exact temperatures is attempted.



Joint of line pipe emerging from furnace, pipe-treating plant of Oklahoma Natural Gas Co., Tulsa. Tongs at end of pipe are used to keep it revolving while passing through furnace. N. P. N Staff Photo

ON a recent test, the company found that 4-inch line pipe can be put through the entire re-conditioning process at a cost of one half-cent a foot, including cost of gas, electric current, paint, and labor. For larger pipe, the cost is higher, but only in proportion to larger surface to be heated and painted. New 4-inch line pipe is quoted by a supply company at 56 cents a foot, delivered in Tulsa.

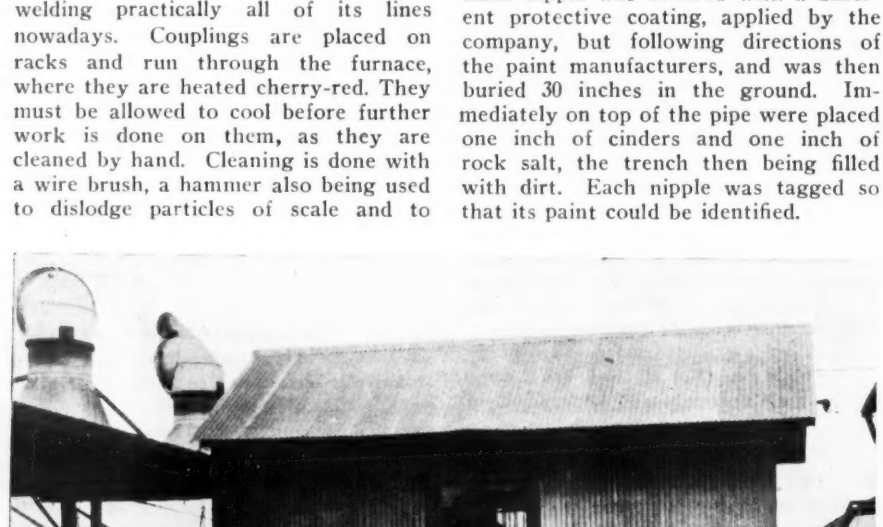
Couplings coming in from the field with the line pipe are also re-conditioned at the pipe plant, although it is beginning to be a problem for the company to decide what to do with them after they are put in shape, as it is welding practically all of its lines nowadays. Couplings are placed on racks and run through the furnace, where they are heated cherry-red. They must be allowed to cool before further work is done on them, as they are cleaned by hand. Cleaning is done with a wire brush, a hammer also being used to dislodge particles of scale and to straighten out couplings if bent. They are then painted with priming coat and stored in sheds.

The Oklahoma Natural at present is using an enamel pipe coating that has been found satisfactory as a protection against corrosion. Before deciding upon any special kind or brand of pipe coating, the company made some interesting experiments to test the various coverings. About 40 small pipe nipples were selected and machined down in order to give each a bright surface. Each nipple was covered with a different protective coating, applied by the company, but following directions of the paint manufacturers, and was then buried 30 inches in the ground. Immediately on top of the pipe were placed one inch of cinders and one inch of rock salt, the trench then being filled with dirt. Each nipple was tagged so that its paint could be identified.

These nipples were left buried 90 days, when they were dug up for examination. It was the company's idea that placing the cinders and salt in the hole would tend to bring about intensified corrosion, and that the 90-day test would equal about two years' service under ordinary ground conditions. As a result of inspection of these samples, and taking all factors into consideration, the company decided upon the type of pipe covering it is now using.

THE company seldom makes soil analyses when preparing to lay lines, but does analyze the water through which the line will have to pass. If the line must traverse a low place where salt water seeps in or flows through, the line usually is laid in waterproof cement, as this has been found the only method that will satisfactorily protect pipe under such conditions. While laying a new 16-inch line to Oklahoma City last year, the company was forced in one place to lay 500 feet of line in cement, on account of salt water drainage from oil wells.

While laying in cement protects the line thoroughly, it makes practically impossible salvaging the pipe if the line is ever taken up. When using this method, a form is built and placed in the ditch. The pipe is then laid on bricks or other supports to hold it up from bottom of form and the cement is then poured around it. The forms remain in the ditch, which is filled in with earth as soon as the cement has set.



Couplings from used pipe line being re-conditioned at plant of Oklahoma Natural Gas Co., Tulsa. Pipe furnace in left background. N. P. N. Staff Photo

Sales Meet in Indian's Dayton District

DAYTON, O.—A two-day sales convention was held at the Gibbons Hotel here recently by the Dayton district of the Indian Refining Co., Inc., Lawrenceville, Ill. Sales program for the current year was discussed. P. C. Conder, district manager here, presided at the meeting. Officials from the home offices attended the meeting.

Panhandle Average Yield Per Well Now is Half the Peak Figure

By Paul Wagner
N. P. N. Staff Writer

HOUSTON, Feb. 5

KEEPING books on an oil field, or general development area, may prove no less interesting than balancing one's own accounts to check assets against liabilities.

Analysis of Texas Panhandle development in 1926 shows the following productive results:

(1)—A net gain of 742 producing wells drilled, at an average estimated cost of $40,000.

(2)—The bringing-in of 393,619 barrels of new production, which represents an average initial yield per well of 530.4 barrels.

(3)—The rise of per well per day yields from 86.5 barrels, Jan. 1, 1926, to a peak of 344.5 barrels, June 12, last, and subsequent declines to the level of 179 barrels at the end of the year.

(4)—The rise of the field from 5217 barrels total daily production, Jan. 1, 1926, to the peak of the Panhandle territory of 167,597 barrels, in the week ended Nov. 20, last; and its decline to 143,775 barrels at the end of the year.

Field Results Summarized

AN accompanying table summarizes Panhandle development, and the results obtained therefrom in 1926. The territory had 803 producing wells to its credit at the end of 1926 as compared with 61 at the beginning of the year.

The first 88 wells completed in 1926 were responsible for the increase of the per well per day production average from 86.5 barrels, at the beginning of the year, to 344.5 barrels, in the week ended June 12. The next 83 wells kept the average zigzagging somewhat below this level, the nearest subsequent approach to the peak level being in the week ended July 24, when a secondary peak of 332.6 barrels per well per day was reached. Thereafter, the trend was generally downward until the end of the year; except that the drop in per well per day averages would be temporarily arrested in weekly periods when unusually large numbers of wells were completed.

It has been pointed out as an interesting sidelight to analysis of Panhandle yields that the daily production of the territory at the end of 1926 amounted to roundly one-third per cent of the year's total initial production.

Trends Previously Indicated

THE accompanying table brings down to the end of the year similar data to that previously published in the Oct. 27, 1926 and the Dec. 22, 1926 issues of this periodical. The accompanying table shows the number of producing well completions from week to week, for the year, together with figures representing the total initial production of similar periods.

Because of inability to readily segregate completions and initial production figures as applied to sub-divisions of the general area, the table accompanying the present article deals with the Panhandle territory as a whole; earlier figures were set up so as to show results obtained by development of the entire Panhandle, on the one hand, and Hutchinson county, as segregated from it, on the other.

In addition to the oil completions previously mentioned, the Panhandle territory provided a materially increased potential gas supply from a total of 31 completions in 1926. The estimated open flow total volume with which these wells were credited amounts to 766,000,000 cubic feet of gas daily. The volume mentioned is in addition to that capable of being produced from wells completed prior to 1926; also the figures mentioned take no account of gas from wells which are also producing oil.

Eldred Refining Meets

AUBURN, N. Y. Feb. 5.—Oil refining and distributing matters were discussed by Harry S. Hayden, general sales manager of the Pennsylvania Oil Products Refining Co., Warren, Pa., and vice president of the Eldred Refining Co., Eldred, Pa., at the annual meeting of the Eldred Refining Co. of New York, Inc., Auburn, held at the Onondaga Hotel, Syracuse, Jan. 26.

Managers and salesmen from the Eldred company plants at Rome, Rochester, Oswego, Wallington, Moravia, Waterloo and Auburn, N. Y., and representatives of the Syracuse Oil Co., Inc., were present.

The Eldred Refining Co. of New York, Inc., is the New York distributor for the Pennsylvania Oil Products Refining Co., and has been operating in that state for the past five years.

ANITA, IA.—Two tanks of 15,000 gallon capacity each have been installed here recently for gasoline and kerosene storage by the F. A. Black Oil Co.

Pure Oil Co.'s products are handled.

Texas Panhandle Field Performance in 1926

Week Ended	Wells Producing	Number Completions In Week	Week's Total Init. Prod.	Daily Field Average	Per Well Per Day Average
1- 1-1926	61	2*	150	5,217	86.5
1- 8-1926	61	1*	50	4,897	80.3
1-15-1926	61	2*	315	5,448	89.3
1-22-1926	62	..*	..	5,681	91.6
1-29-1926	65	..*	..	5,376	82.7
2- 5-1926	66	..*	..	5,445	82.5
2-12-1926	68	2	315	5,082	74.8
2-19-1926	74	6	2,280	6,147	83.0
2-26-1926	74	..	..	6,406	86.6
3- 5-1926	74	..	..	6,404	86.6
3-12-1926	75	1	1,250	7,040	94.0
3-19-1926	78	..*	..	7,796	99.9
3-26-1926	80	2	590	9,048	113.1
4- 2-1926	83	3	410	9,427	113.6
4- 9-1926	88	5	2,140	9,720	110.5
4-16-1926	95	7	5,815	10,136	106.7
4-23-1926	99	4	1,650	16,095	162.6
4-30-1926	100	1	2,125	15,897	158.9
5- 7-1926	103	3	4,520	18,303	177.7
5-15-1926	103	..	..	24,722	240.0
5-22-1926	126	23	22,270	31,110	246.9
5-29-1926	139	13	7,850	38,793	279.0
6- 5-1926	151	12	4,615	39,406	261.0
6-12-1926	149	(	13,515)	50,337	344.5
6-19-1926	172	23)	5,830)	52,723	306.5
6-26-1926	184	12	3,130	48,051	261.1
7- 3-1926	186	2	2,210	56,418	303.3
7-10-1926	204	18	14,715	55,331	271.2
7-17-1926	217	13	7,030	63,303	291.7
7-24-1926	232	15	6,840	77,157	332.6
8- 2-1926	255	23	10,845	82,553	323.7
8- 9-1926	279	24	26,521	89,714	321.5
8-13-1926	328	49	22,152	97,187	296.3
8-20-1926	366	38	19,575	107,005	292.3
8-27-1926	389	23	11,170	118,034	303.4
9- 3-1926	399	10	5,680	116,323	291.5
9-10-1926	415	16	9,195	118,731	286.1
9-17-1926	440	25	6,425	121,711	276.6
9-24-1926	474	34	12,370	122,443	258.3
10- 1-1926	487	13	16,280	125,935	258.6
10- 8-1926	508	21	19,410	144,213	283.8
10-15-1926	549	41	18,060	154,651	281.7
10-22-1926	594	45	24,771	161,973	272.6
10-29-1926	616	22	8,370	159,612	259.1
11- 6-1926	636	20	6,630	161,509	253.9
11-13-1926	666	30	23,180	162,182	243.5
11-20-1926	692	26	5,755	167,597	242.1
11-26-1926	709	17	5,580	162,317	228.9
12- 3-1926	736	27	13,665	158,988	216.0
12-10-1926	762	26	12,145	159,232	208.9
12-17-1926	770	8	4,100	158,550	206.0
12-24-1926	793	23	2,125	152,400	192.0
12-31-1926	803	10	..	143,775	179.0

*Apparent discrepancies in "Producing Wells" Column result from shutting in or opening up of wells previously listed among completions, including workovers

The Editors' Viewpoint

National Petroleum News

Let the Oil Industry Devise Control Of Substitution if Evil Exists

SUPPORT for the idea of government taking a hand in curbing the alleged substitution of motor oils, was found by the Better Business Bureau of St. Louis as a result of a questionnarie recently sent to antomobile owners in Missouri.

The number of questionnaires sent out is not given by the bureau, so the actual amount of support to the various ideas cannot be determined. However, of those replying 9 per cent urged that the state should maintain an inspection of motor oils at service stations, 5 per cent urged special legislation, and 2 per cent advocated the bonding of all service stations. This makes a total of 16 per cent who advocated some form of government supervision of service stations.

While the news bulletin, which is all the statement which the bureau has issued, does not say, the manager of the merchandise division of the bureau, K. W. Hood, says the investigation was only made among independently owned service stations and garages. One of the criticisms which has been made by this paper against these various investigations, is that newspaper publicity which has been put out has not been accurate. Time and again, as in this case, publicity has not brought out that the investigation had been made only among certain types of service stations. The public has been left to believe the conclusions applied to all service stations.

The chief danger of this substitution outcry, as National Petroleum News has continually pointed out, is that it invites government interference. Oil inspection departments of the various states are searching continually for a means of justifying their present practically worthless existence.

National Petroleum News has continually insisted that the oil industry be given full opportunity to study this situation, get the facts and if it should require control, devise methods to control it itself. If after thorough investigation and consideration, the industry is unable to control the situation, then something may well be suggested to the government. Various active oil interests large and small who have not been parties to this outcry, are not conscious of any substitution on their goods, nor do they know of substitution, except where national brands have been put in the hands of irresponsible service station and garage owners.

National Petroleum News believes that this outcry has done the oil industry great damage; that it has worked against the efforts of the Committee on Public Relations of the American Petroleum Institute and that therefore it is a subject which could well be considered at once by that committee.—W. C. P.

* * *

The report issued to the newspapers by the Better Business Bureau of St. Louis as a result of its investigation follows:

"Recently the Better Business Bureau was called upon to make an investigation to learn whether or not the substitution of lubricating oils was prevalent in St. Louis. A list of 90 service stations was selected and a car equipped with a special device to retain samples of oil supposedly poured in the crankcase, was used. A certain well known brand of oil was called for at each station. In almost all instances photographs were taken of the man pouring the oil into the car. All samples secured were submitted to a chemist to be compared with a sample of the genuine. The chemist reported that 51 out of 90 samples were not genuine.

"A representative of the bureau accompanied a special investigator for another company which happened to be working in St. Louis at the same time. The bureau man witnessed the purchase of several samples. It was reported that out of the first 10 samples submitted by this company to a chemist, six were substitutes and that out of the six, two were crankcase drainings.

"Better Business Bureaus in other cities have conducted similar campaigns with similar results. In many cases prosecution has been resorted to. After some discussion as to a plan of action in St. Louis, it was decided to warn each station and to resort to prosecution only upon second offence. Because of the possibility that in at least a few cases, the result might have been caused by carelessness on the part of an employe rather than criminal intent, it was decided not to publish the names until a second offense was committed. When so serious a charge as that of deliberate fraud by substitution is made, publication of the names might result in ruination of the business of the respective companies.

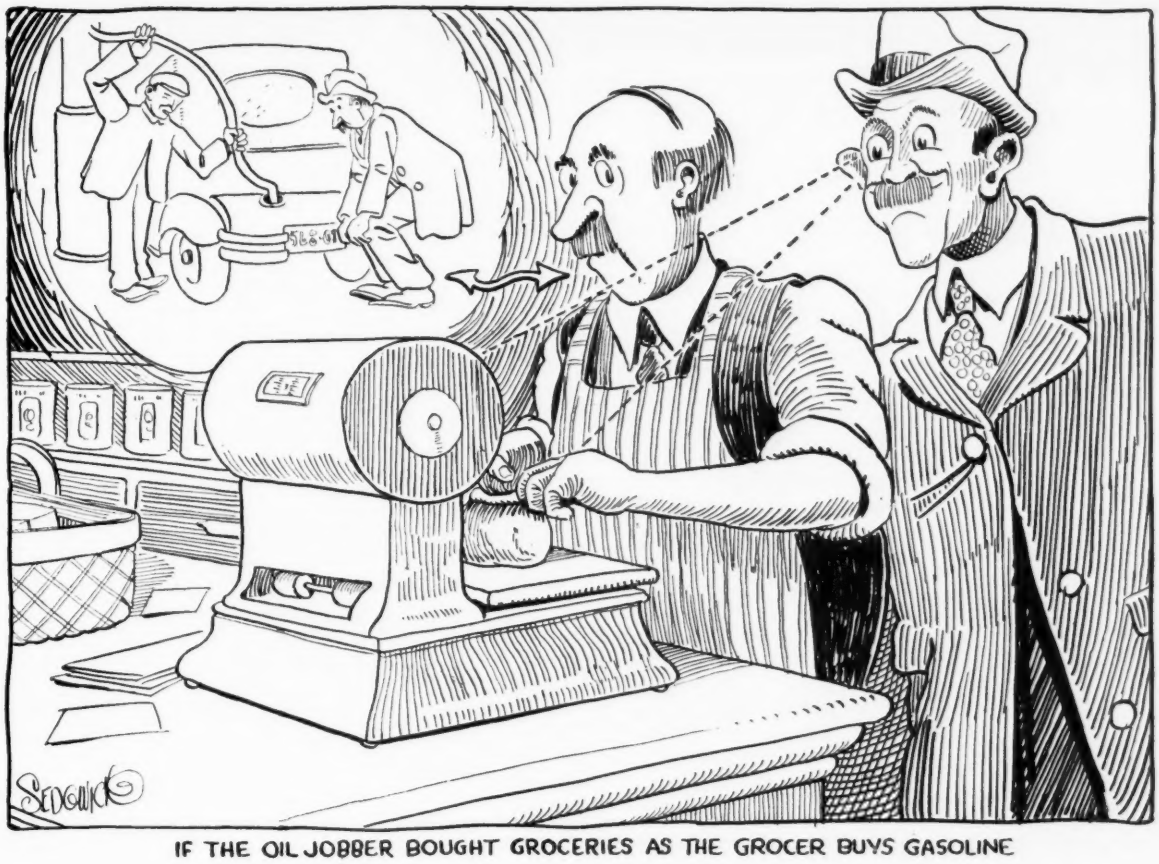
"As a feature of its investigation of lubricating oil substitutions, the Better Business Bureau was enabled to send a questionnaire to the St. Louis members of the Automobile Club of Missouri, through the courtesy of the officials of that organization. Over 21 per cent of these questionnaires were returned, properly filled out. We believe this is a record above the average and indicative of the high character of the club's membership. We are listing the questions asked below, together with the percentage of total replies given to each question. For convenience, whenever a percentage figure exceeded 0.5 per cent it was credited as a full per cent, but where the fraction was less than one-half, it was not counted.

"1. When buying oil for your car do you specify a trade-marked brand?

Replies: 85%, YES; 15%, NO.

"2. If you do buy a trade-marked brand, do you prefer to buy it in bulk or cans?

Replies: 45%, in bulk; 47%, in cans; 5%, in large drums; 8%, immaterial.



IF THE OIL JOBBER BOUGHT GROCERIES AS THE GROCER BUYS GASOLINE

"3. Please check any of the following reasons which cause you to specify trade-marked names:

a. Confidence in the manufacturing company.....38%
b. Belief that an advertised product is of higher quality.....19%
c. As a result of your own experience.....28%
d. On advice of garage man 6%
e. On advice of a friend 5%
f. Other reasons:

A few special reasons were given, chief of which were recommendation by the automobile manufacturer, analysis, and financial interest in company.

"4. Do you experience any effort on the part of the seller to urge you to buy an unbranded oil?

Replies: 12%, YES; 88%, NO.

"5. Have you had this experience in the past?

Replies: 18%, YES; 82%, NO.

"6. How do you determine whether you are receiving the brand of oil ordered?

1. 35%, patronize only reliable firms (no suggestions given as to how one may judge of reliability.)
2. 21%, judge by name on container.
3. 10%, purchase only from refining company stations.
4. 9%, select one station and patronize only that station.
5. 7%, buy direct from manufacturer.
6. 7%, depend on person from whom car was purchased.
7. 6%, judge by experience—action of motor.
8. 4%, judge by look and feel of oil.

Only two persons stated that they had oil tested by chemical analysis.

"7. Please give name and address of any garage or filling station that you feel is making a practice of substituting.

A number of names were received, but are not disclosed for obvious reasons.

"8. If you have any suggestions which you believe will be valuable in curbing oil substitution frauds, please outline them on the reverse side of this sheet. Of the total number of special suggestions made, the percentages were as follows:

42%, encourage to buy in sealed cans only.
28%, patronize only filling stations operated by large companies.
9%, maintain state inspection.
6%, take test samples often.
5%, pass special legislation.
3%, prosecute.
2%, bond all service stations.
2%, purchase direct from manufacturer.
2%, special seals on pump drums.
1%, advertise simple test."

Common Sense Will Lay Ghosts

AN attack on the oil companies doing business in Cleveland, was launched in the newspapers recently by Fred H. Caley, secretary of the Cleveland Automobile club. It was the same sort of attack that is periodically directed against the oil industry in various parts of the country by automobile clubs and other organizations.

The cry of Mr. Caley was that Cleveland motorists are being sold "poor gasoline." The impression given by the newspaper article was that practically all the gasoline being sold in Cleveland was "poor." Mr. Caley, in an interview, however, said he did not intend to give this impression, but only to state that a number of "gyp" dealers were selling gasoline of poor quality.

Mr. Caley's notion of what constitutes "good" gasoline was based on the statements of a chemist in Cleveland who was careful to say later that he had stated merely his own opinions and not necessarily scientific facts. His idea was that 75 per cent of that fraction of gasoline which does not vaporize at 350 F. or below, is wasted and worse, dilutes the crankcase oil.

The ideas of Mr. Caley and his chemist are based on the wrong premises. The fact is, if a motorist buys from a "gyp" dealer gasoline that does not suit him, his remedy is to stay away from that dealer and buy his gasoline from a reputable dealer. There is nothing to hinder a motorist from trying a fill of every kind of gasoline sold in his town, find out the one which gives him the most satisfaction and stick to it.

There are plenty of companies with good reputations, selling good products, and competition is so keen for every motorist's business that dealers selling poor gasoline, if in fact there are any, wont last long in the business.

The secretaries of automobile clubs are quite given to seeing ghosts and the remedy for their ghosts, as for all other such manifestations, is common sense and not unwarranted abuse of the oil industry.—P. T.

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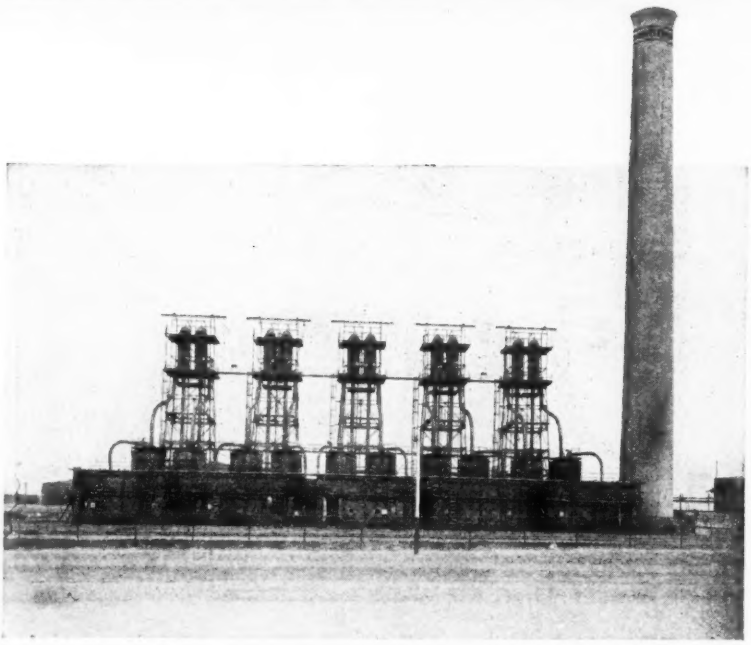

The Dubbs Cracking Units in the Parco, Wyoming refinery of the Producers and Refiners Corporation shown here, are insulated with Sil-O-Cel brick. Universal Oil Products Company, Chicago, builders.

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Columbia Refining Co. to Give Dance

CLEVELAND, Feb. 7.—Columbia Refining Co., distributors of petroleum products in Cleveland and northern Ohio as far west as Toledo, will give a dance Saturday evening, Feb. 19 at the Woman's club, Cleveland, for its employes in Cleveland and the rest of its territory, and also friends and associates in the oil industry. Oil men are expected from Pittsburgh and Oil City. This will be the fourth annual affair given by the Columbia company which is managed by Burt Zimmerman. A large gathering has marked each previous dance and attendance this year is expected to surpass that of previous years.

Howard Justice, Standard Oil Co. of Ohio, a tenor known to the radio audience of this region, and Robert Roberts, baritone, will sing solos and duets. Both men are members of the Orpheus choir of Cleveland which was the winner in the senior choir class at the world eisteddfod in Wales last summer.

Fine, If You Like Snow

HANCOCK, MICH.—Everyone who can is being urged by Frank Francis, manager for H. S. Goodell, oil jobber here, to attend the winter carnival which the Michigan College of Mines students will hold on Feb. 22 at Portage Lake.

Mr. Francis says that the country in this section is "worth seeing" as snow is banked two to 12 feet in places. He also says that this is the first time in history that it has been possible to motor through in the winter around here.

Skiing, snowshoeing, skating and other winter sports will be on the program.

Further Teapot Delay Expected

WASHINGTON, Feb. 5.—Albert C. Fall and Harry F. Sinclair, it is almost certain will not be brought to trail for conspiring to defraud the government in the Teapot Dome lease and contract matter until some time next fall. Fall's illness has caused the trial to be postponed from February 2 to April 25. The docket of the trial court is such that the chances are against the case being more than formally called in April.

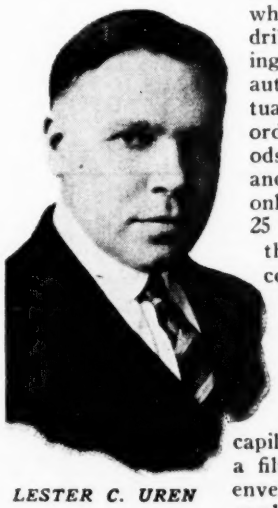
Motorists Go Back to Horses

LANSING, MINN.—"A poor winter for oil stations" is the way B. L. Stimson, manager of Lansing Oil Co., describes conditions in this section. Roads have been blocked with snow most of the time and erstwhile motorists use horses, or stay at home, he says. Snow is piled from six to eight feet high on either side of the road for several miles each side of this town, Mr. Stimson reports.

Measuring Natural Forces That Hold Back Flow of Oil in Ground

By Lester C. Uren
Professor of Petroleum Engineering, University of California, Berkeley

TWO natural forces and a variety of physical limitations attending oil drainage, are responsible for the retention of 75 per cent or more of the original oil content of practically every oil deposit where wells are drilled. According to reliable authorities, actual recovery by ordinary methods of flowing and pumping is only from 10 to 25 per cent of the original oil content. The greater part of the oil retained is held within the sand pores by capillarity, and as a film completely enveloping each sand grain, the latter being due to the force of adhesion.



LESTER C. UREN

In addition a large percentage of the original oil content probably remains in the sand by reason of the inadequacy or inefficiency of application of the expulsive forces. In the previous article of this series, it was shown that dissolved and occluded natural gas—the principal expulsive agent—is probably less than 10 per cent efficient in its application. The frictional resistance offered by minute sand pores to the movement of a viscous oil, is so great that the available expulsive forces are often inadequate to cause movement of the oil into a well at a commercially profitable rate.

Other forces active in expelling oil from the sands are also likely to be inefficient in their operation. For example, the hydrostatic pressure of edge-water often produces irregular flooding effects, leading to the trapping of large bodies of oil in fine-grained, lenticular oil sands that become surrounded by water-saturated sands of coarser texture. Gravitational drainage leaves large bodies of oil-saturated sands below the drainage slopes formed by the "angle of repose" of oil in the sand. A proper understanding of the forces and conditions which limit the efficiency of the expulsive forces is essential in the development and application of effective production methods.

Capillary Retention of Petroleum in Reservoir Rocks

Porous solids containing openings of capillary size exert an attraction contact to draw the liquid into the pore spaces. Examples of capillary action are common in every-day, familiar objects and operations, such as the absorption of ink by a blotter, the drying effect of a towel, and the rise of kerosene in the wick of a lamp or stove. In a similar way, by operation of capillary force, the pores of a sand or rock absorb oil, and the same force resists other forces which may later tend to expel the oil from the rock pores.

Rise of Oil in a Capillary Tube

CAPILLARITY results from the combined operation of several natural forces. The molecular attraction which exists between the oil and the mineral composing the reservoir sand, causes the oil to spread over the grain surfaces. The surface tension of the oil resists this extension of the oil surface, and cohesion prevents its disruption under the influence of the opposing forces. We may conveniently study the effects of these forces by considering their several functions when oil is caused to rise in a capillary tube. Consider the conditions sketched in Figure 1, for example.

A capillary tube, open at each end, is held in an upright position with the lower end immersed below the surface of oil in a beaker. The molecular attraction existing between the oil and the glass, of which the tube is composed, causes the oil to spread up the glass walls of the tube, above the surface of the fluid in the beaker. Along their line of contact, the oil curves upward against the glass as a result of this attractive force. The surface tension of the oil resists distention of its surface, and is powerful enough to lift a column of the oil in the tube. The cohesion of the liquid prevents the oil column from severing connection with the reservoir of oil below. The attraction of the glass for the oil is capable of drawing the oil upward indefinitely, until limited by the ability of the surface tension of the liquid to support the oil column below. The column of oil thus gradually climbs in the tube until an equilibrium condition is reached.

If we assume, in Figure 1, that the system has come into equilibrium, and if

T is the surface tension of the oil in dynes per centimeter,

R is the radius of the tube in centimeters,

G is the density of the oil relative to pure water at 0°C.,

A is the acceleration of gravity in centimeters per second per second,

H is the capillary rise in centimeters, and

a is the angle of contact made by the oil against the glass surface, it can be shown that[1]:

$$H = \frac{2\ T \times \text{cosine } a}{A \times R \times G} \quad \ldots\ldots\ldots (1)$$

Methods of Determining Surface Tension

FORMULA (1), above, indicates that the capillary rise is directly proportional to the surface tension of the oil, and inversely proportional to the oil

[1]Washburne, H. H., "Introduction to the Principles of Physical Chemistry." McGraw-Hill Book Co., 1915. See particularly pages 40-52.

Influence of Back-Pressure on Recovery

READERS of this series of special articles by Prof. Uren, recognized authority on oil production practice, are fortunate in having given them the fundamental theories regarding natural forces affecting the flow of oil in the ground which underlie the present discussion on advisability of legislation to conserve gas in the ground in oil fields.

The Uren articles will give the oil man a better basis for discussing the issues presented through the introduction in Oklahoma of the bill to force operators to hold back-pressures on their wells.

With his next article Prof. Uren comes to the subject directly involved—the influence of back-pressures in securing increased efficiency in oil recovery. It is only in the last few years, through experiment and research work, that the oil industry has begun to learn the effect of natural gas dissolved in the oil on flow of oil in the ground.

New discoveries along this line are being continually made. The purpose of Prof. Uren, in this special series, is to keep the practical oil man, too busy to do the extended reading necessary to keep up with these new developments, informed upon new methods and new theories which are to come into practical use on oil producing properties.

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density. This relationship provides a convenient means for determining the surface tension of an oil, and measurement of the height of rise of oil in a capillary tube is one of the commonly used methods for estimating surface tension. Other methods requiring more elaborate apparatus involve the measurement of the force necessary to pull a wire ring of standard proportions up through the oil surface, or the determination of the weight of a drop of the fluid as formed under standard test conditions, on the tip of a pipette. The writer has found the du Nouy Tensiometer, which makes use of the ring method, a rapid and convenient means of making comparative tests on the surface tension of oils. The du Nouy instrument is illustrated in Figure 2.

The various methods for determining surface tension do not produce concordant results when applied to petroleum, probably because the tension of fluid mixtures is not constant, being influenced to an important degree by surface absorption, which slowly changes with time. The capillary tube method of measuring surface tension, which is slow in operation and gives ample time for the surface forces to reach equilibrium, gives consistently lower results than other methods. (See Table 1).

Surface Tension of Crude Petroleum

IN view of the fact that the magnitude of capillary force, and therefore, the extent of capillary retention of petroleum in reservoir rocks, is directly proportional to the surface tension of the oil, it will be of interest to compare the surface tensions of various crudes to see to what extent this property varies. Harvey[2] has conducted a series of tests on oils from many American fields with the aid of the du Nouy Tensiometer, and reports the values given in Table II.

A previous article of this series[3] has shown that, on account of the solution of large quantities of hydrocarbon gases at elevated pressure, the surface tension of crude petroleum increases as the pressure is increased. It is also known that surface tension decreases markedly as the temperature rises.

Capillary Attraction of Unconsolidated Sands for Crude Petroleum

IN considering the capillary attraction of porous reservoir rocks for oil, it is apparent, from the foregoing discussion, that the force exerted will depend primarily upon the size and shape of the sand pores and the surface tension and density of the oil. The first article of this series[3] presented data indicating the

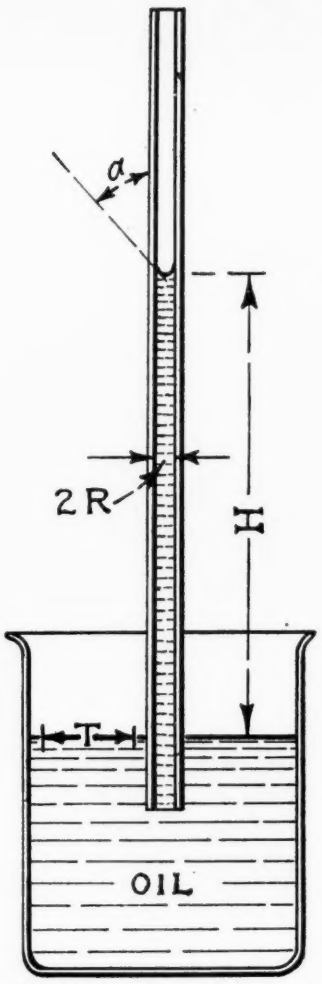

Fig. 1—Illustrating rise of oil in a glass capillary tube

probable size of the sand pores for different sizes of grains. It was there shown that both the porosity and grain size were instrumental in determining the size of the pore spaces between grains, and that even in sands as coarse as twenty mesh, the minimum cross-section of the pore spaces is only 0.035-sq. mm., or about 0.22-mm. in diameter.

It is known that capillarity is exerted by glass-walled tubes on water, only when the tubes have a diameter of less than 0.508-mm[4]. In the case of crude petroleum and silica sands, the maximum size of pore opening exerting capillary force is probably somewhat less than this, but the exact value is unknown. However, research conducted under the direction of the writer by Mr. A. H. El Difrawi[5], has indicated that un-

[2]Harvey, E. H., "The Surface Tension of Crude Oils," Industrial & Engineering Chemistry, Vol. 17, January, 1925, p. 85.
[3]See National Petroleum News, issue of January 19th 1927.
[4]Washburne, C. W., "Capillary Concentration of Gas and Oil," Transactions, Amer. Inst. Mining & Metall. Engrs., Vol. L. (1914), p. 831.
[5]El Difrawi, A. H. "A Quantitative Study of the Various Factors Influencing Gravity Drainage of Oil from Saturated Sands," a thesis for the degree of Master of Science, University of California, December, 1926.

Table 1—Comparison of Surface Tension Measurements by Various Methods

Oil From	Surface Tension in Dynes as determined by: du Nouy Tensiometer	Capillary Tube	Drop-Weight Method
Madill Field, Oklahoma	26.8	23.9	25.6
Burkburnett Field, Texas	30.0	27.3	28.8
Alleghany County, New York	30.2	27.3	28.9
Augusta Field, Kansas	31.5	28.5	30.3
Corning Field, Ohio	30.5	27.5	29.3

consolidated sands coarser than thirty mesh do not, in general, display appreciable capillary attraction on crude petroleum, while sands of finer size do so.

Table II. Surface Tensions of Crude Petroleums from Various American Oil Fields as Determined with the Du Nouy Tensiometer*

State	Field	Surface Tension in Dynes/cm
Arkansas	El Dorado	30.2
California	Coalinga (East Side)	34.3
	Kern River	37.7
	Sunset	35.7
	Santa Maria	31.5
	Montebello	35.6
Kansas	Augusta	31.5
	Florence	31.2
Indiana	Lima	30.9
Illinois	Lawrence	30.9
Kentucky	Ragland	32.9
Louisiana	Caddo	30.5
	Pine Island	34.3
Montana	Winnett	27.4
New York	Alleghany County	30.2
Ohio	Lima	30.9
	Corning	30.5
Oklahoma	Billings	29.8
	Ponca	30.2
	Cushing	29.8
	Hewitt	31.2
Pennsylvania	Mercer County	32.9
	Alleghany County	28.8
Texas	Burkburnett	30.0
	Humble	34.6
	Goose Creek	33.6
	Media	31.2
	Somerset	29.1
	West Columbia	33.6
Wyoming	Big Muddy	32.2
	Salt Creek	34.3

*Note: All measurements were made at a temperature of 24°C

The capillary force developed was also found to vary with the sand porosity

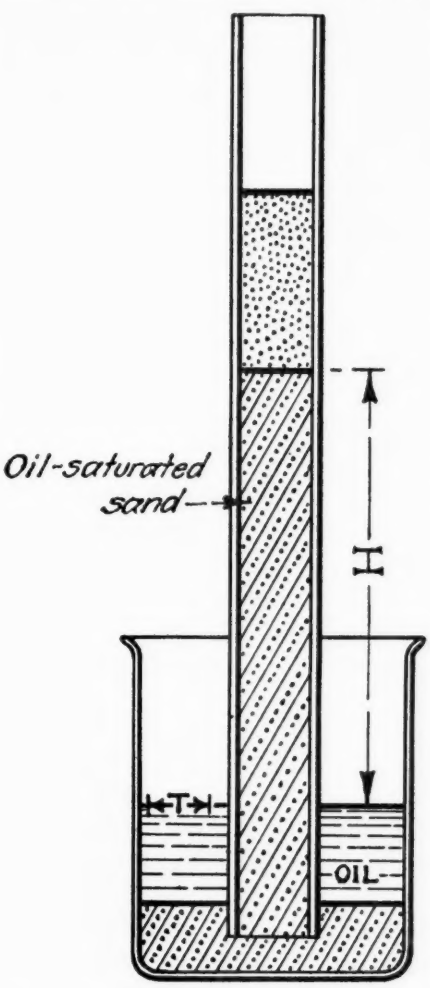

Fig. 3—Apparatus used in measuring capillary rise of oil in sand

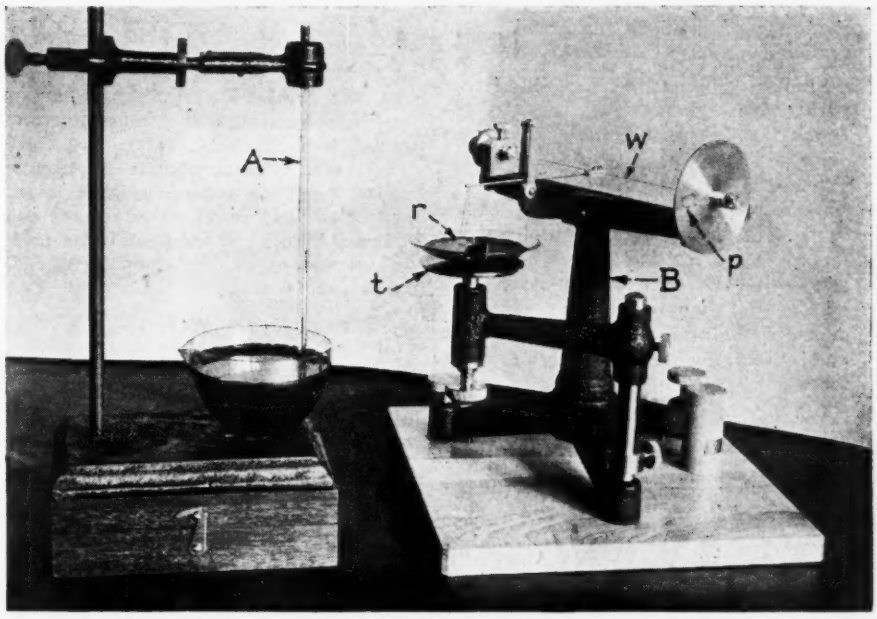

Fig. 2—Apparatus for measuring the surface tension of oils. A—Capillary tube; B—Du Nouy Tensionmeter; R—Platinum wire ring; W—Torsion wire; T—Adjustable table for supporting oil container; P—Recording pointer and graduated dial

which, as has been previously pointed out, is jointly responsible with the size of sand grain, in determining the size of the sand pores. The magnitude of capillarity increases as the size of grain and porosity decrease.

In an effort to determine quantitatively, the magnitude of capillary force in rock pores of various sizes, El Difrawi performed a series of experiments in which the capillary rise of crude petroleum in accurately sized, unconsolidated sands of known porosity, was determined.[6] Screened sands of various sizes, ranging from 20 to 70 mesh, were compacted in glass tubes to various porosities and the sand-filled tubes supported in a vertical position with their lower ends immersed in a reservoir filled with crude oil of known surface tension, density and viscosity. (See Figure 3). After the oil drawn up into the sand by capillary force had reached an equilibrium position, the height of capillary rise of oil in the sand above the surface of oil in the reservoir was measured. From the data so secured, the following empirical formula was derived:

$$H = \frac{275 \times T \times \text{cosine } a}{G \times P^{2.3} \times D} \quad \ldots\ldots (2)$$

In this formula,

H is the capillary rise in inches,

T is the surface tension in dynes per centimeter,

a is the angle of contract between the oil and the mineral composing the grains of sand,

G is the specific gravity of the oil,

P is the porosity of the sand in per cent, and

D is the mean diameter of the sand grains in millimeters.

This formula permits of some interesting deductions and applications. It shows, for example, that porosity is the most important factor in determining the magnitude of capillary force. The surface tension and specific gravity of the oil and the size of the sand grains are factors of lesser importance than porosity. The investigation also indicated that the viscosity of the oil is not a factor in determining the magnitude of capillary retention.

In discussing gravitational drainage of oil from sand, in the previous article of this series, it was explained how a zone of oil-saturated sand in the bottom of the productive stratum, is left undrained by normal processes of recovery. This layer of undrained sand is composed of two parts: that below the "angle of repose," which contains oil beyond the influence of gravitational drainage, and that above, comprising a body of sand which was described as the "zone of capillary retention," a zone which remains saturated with oil by operation of capillary force.*

The thickness of the zone of capillary retention is equivalent to the height to which the oil would rise in the sand under the influence of capillary force, and may, therefore, be computed with the aid of formula (2) given above. Applying the formula, for example, to an oil having a surface tension of 25-dynes per centimeter (measured by capillary tube method), and a specific gravity of 0.95, in a sand having a porosity of 20 per cent and an average grain size of 0.2-mm., we find that the capillary rise, H, is 36.8-inches. These are not abnormal values, and the result of the computation indicates that a zone of sand three feet thick is left saturated with oil, held by

[6] Uren, L. C., and El Difrawi, A. H., "Capillary Retention of Petroleum in Unconsolidated Sands," Transactions, Amer. Inst. Mining & Metall. Engrs., Feb. 1927.

*See Figure 5 of the second article of this series, National Petroleum News, January 26, 1927.

the force of capillarity after all normal drainage ceases.

Similar computations for oils of comparatively high surface tension, low density, and for sands of very low porosity and small grain size, show that in extreme conditions the zone of capillary retention may be as much as 15-feet thick. This means that in an oil sand 30 feet thick, as little as half of it may be productive of oil, the remainder being within the zone of capillary retention, in which the oil is permanently held beyond the influence of natural drainage forces.

Where an oil-producing zone comprising several component sands separated by impervious "partings" of clay or shale, is drained, each impervious barrier in the formation will be the base for such a zone of capillary retention. (See Figure 4.) The aggregate volume of oil so retained by capillarity may under such conditions be a large percentage of the original oil content.

Retention of Crude Petroleum in Reservoir Sands by Adhesion

OILS are attracted to most mineral substances by an intermolecular force of considerable intensity. Once brought into contact with the oil, the latter will spread over the mineral surface until the oil is reduced to an exceedingly thin film, or until the available mineral surface is completely engulfed. Of course in an oil sand, every particle of mineral surface is exposed directly to the oil and each grain becomes completely enclosed with an encasing film. When an oil sand is in process of drainage, after all free-draining oil has escaped and the sand pores have become evacuated of oil to such extent as may be permitted by capillarity, the sand grains still remain wet with oil. The adhesive film forms an enclosing envelope which completely surrounds each sand grain, a film held to the mineral surface by intermolecular attraction. This film persists because of the cohesive force existing between the oil molecules, which resists disruption of the oil film.

but rather, as a zone of finite thickness in which the molecules of the liquid interlock, or become "rooted" into those of the solid mineral.[7] There is good evidence indicating that most apparently solid surfaces have, in reality, a loose molecular structure that readily permits fluids to enter. Quartz, marble, porcelain and other minerals are easily stained by oil, and the stain is not merely a surface coating, but extends to measurable depths.

Sand that has been in contact with oil feels "greasy," though the surface oil may have been completely removed by solvents; and if subsequently brought into contact with oil, the mineral will greedily retain it. On the other hand, it cannot be readily wet with water. It seems probable that the sub-surface pores of the mineral may retain a fluid, even though the surface is apparently free of it.

The writer has made microscopic studies of broken fragments of pebbles of various minerals which were previously coated with a thin film of oil, the surplus oil being permitted to drain away and the film to become practically dry by contact with air before the pebbles were broken. Under the microscope, the minute "roots" of the oil film extending into the mineral surface, are clearly visible, varying in depth and character with the crystalline texture of the mineral.

IT should be understood that sand grains though small in size, are nevertheless frequently capable of being broken into much smaller fragments, and the minute cleavage planes and fractures along which such subdivision may occur, communicate directly with the grain surfaces. These minute crevices exert capillary force and often draw oil from the grain surfaces into the very heart of the crystalline structure. Grains of quartz, limestone, feldspar, mica, hornblende and other common sand-forming minerals, all display this tendency, and evidence of it is apparent on crushing sand grains and examining the fragments under the microscope. (See Figure 5).

The writer has performed a series of tests designed to indicate the quantity of oil that may be retained on and within sand grains in this way. In these tests, small pieces of various common sand-forming minerals, about an inch in diameter, were ground to smooth surfaces of geometrical form so that their surface areas could be closely estimated by actual measurement. The specimens thus prepared, were carefully weighed and then dipped in crude petroleum. On removal from the oil, the surplus fluid was permitted to drain away from the specimens by supporting them for ten minutes on pin points. The specimens were then again weighed, and the increase in weight due to the retained oil, determined.

KNOWING the density of the oil and the surface areas exposed to the oil, the volume of oil per unit of exposed mineral surface was then computed. Assuming that the oil retained was distributed on and within the mineral surface in a layer of uniform thickness, the computed thickness of the oil coatings varied with the viscosity of the oil and with the smoothness and texture of the mineral surfaces, but ranged between 0.04-mm. and 0.18-mm., the former volume being obtained for Santa Fe Springs, 31° California crude on quartz, and the latter for 15° Kern River, California, crude on hornblende.

It is interesting to compute the volume of oil that would be thus retained on and within the grain surfaces in sands of various mesh. In the first article of this series,* the writer has given estimated values for the surface areas presented by sand grains of different mesh, per cubic foot of sand. It was shown, for example, that a cubic foot of 28-mesh sand presents a grain surface of 2166 square feet to the oil. If we assume that the oil coating left on and within the grain surface is 0.05-mm. thick, the total volume of oil so re-

[7]Sulman, H. L., "A Contribution to the Study of Flotation," Transactions, Institution of Mining & Metallurgy (London), Vol. XXIX (1919-20), p. 44-204.

*See January 19, 1927 issue of National Petroleum News.

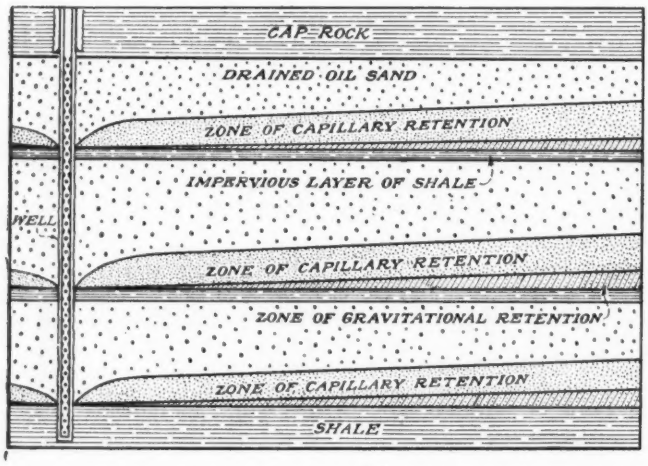

Fig. 4—Sketch illustrating formation of zones of capillary retention above impervious shale "partings" in a productive oil-bearing formation

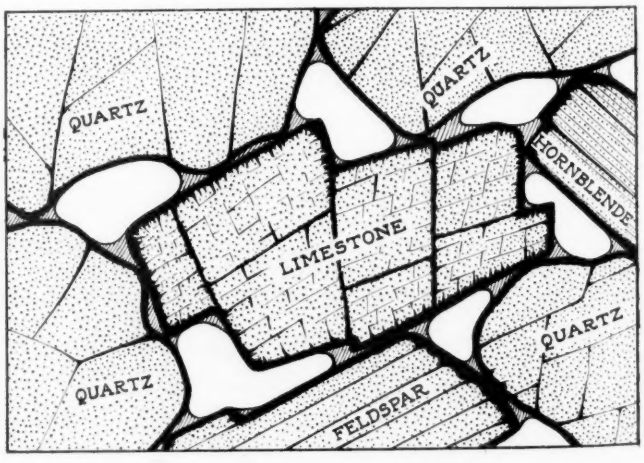

Fig. 5—Sketch illustrating retention of petroleum on, within and between sand grains by adhesion and capillarity. All free-draining oil has been evacuated from larger pore spaces

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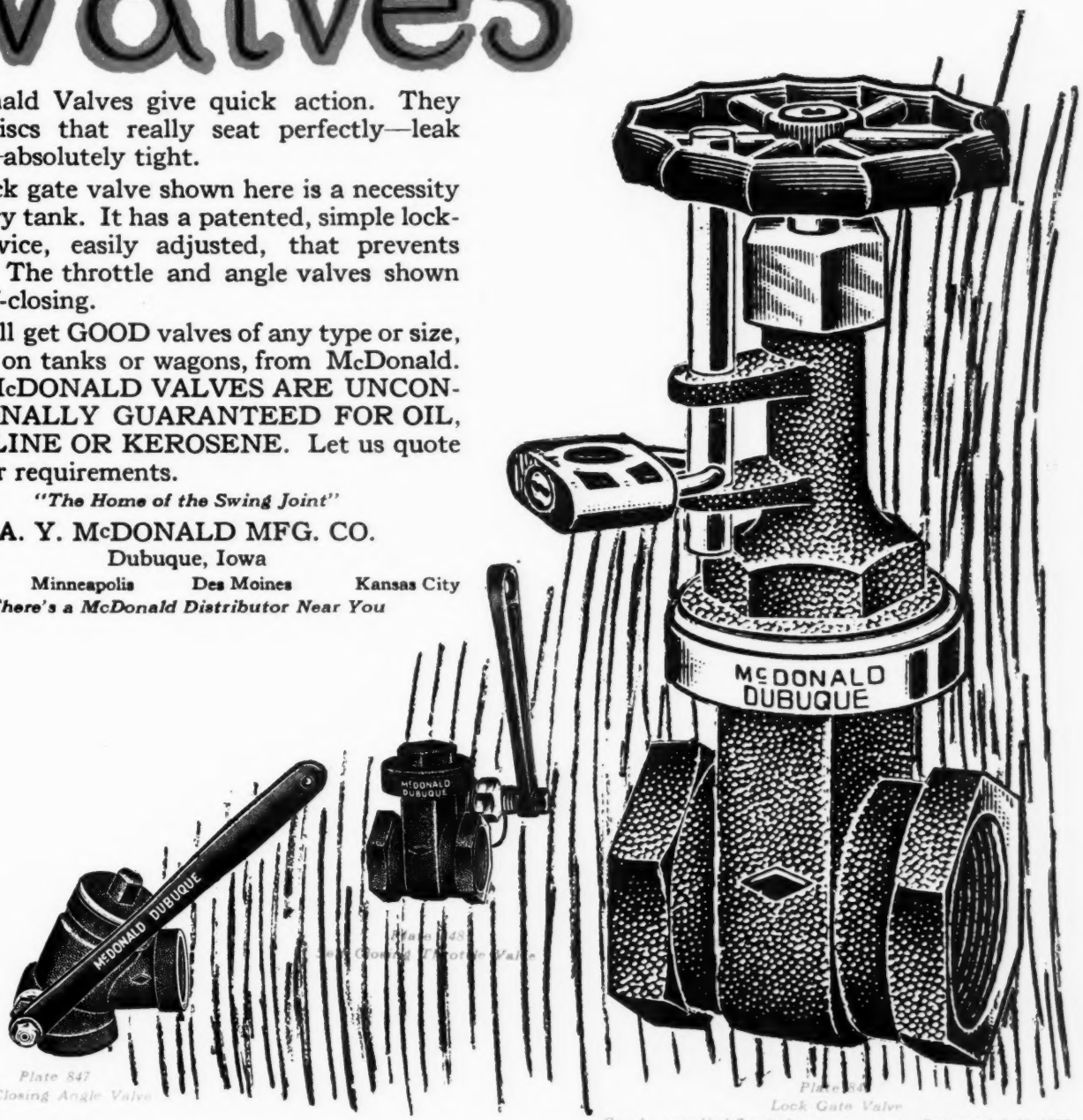

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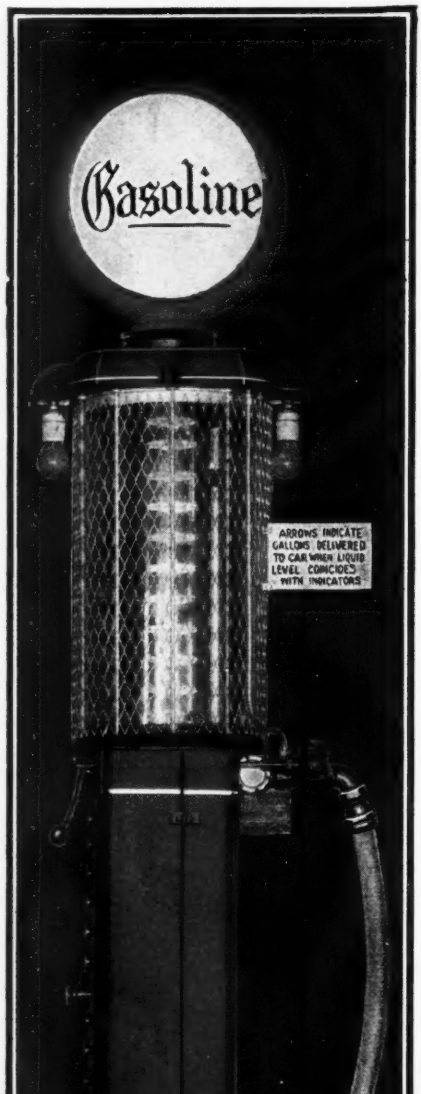

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tained on a cubic foot of sand, would be 0.34-cubic ft. Finer grained sands, presenting a greater surface to the oil, would retain a still greater quantity. A forty-eight mesh sand, for example, would be capable of retaining 0.69-cu. ft. of oil per cubic foot of reservoir sand. It should be noted that oil so retained on and within the sand grains, is not producible by ordinary methods of recovery. It is a component of the oil content of the sand that is separate and distinct from that stored within the pores between sand grains, from which we derive our producible oil.

Hardy and Nottage developed a method for measuring the adhesive force between lubricating oils and mineral substances, and have determined relative values for various oils and mineral substances.[8] It is reported that the adhesive force varies with the character of the mineral substance, but for any given substance, is directly proportional to the molecular weight of the oil, and decreases in a straight-line relationship with temperature.

Resistance to Flow of Oil Through Reservoir Sands

IN the previous article of this series, it was shown that the drainage system of a well assumes the form of a multitude of pore channels, radiating outward through the reservoir sand in all directions from the well as a center. Oil and gas move through these channels toward the well in the form of minute gas bubbles alternating with slender filaments of oil. Irrespective of the character of the expelling force, whether it be expanding gas, hydrostatic pressure or gravitational force, movement of the fluids is resisted by: (a) friction of the oil and gas on the rock material forming the walls of the channels; (b) internal friction of the oil in overcoming its viscosity; (c) the resistance offered by the gas bubbles to deformation in passing through restrictions in the flow channel; and (d) the capillary drag of the minute openings through which the oil must pass.

Considering that pressure is applied in varying degree throughout the entire length of each drainage channel, and that energy is consumed in so many different ways in accomplishing movement of the oil, accurate determination of the resistance to flow becomes a most complex problem. Indeed, no formula has yet been devised which adequately expresses the relationship of all of the variables influencing flow resistance; nor does one seem worth striving for, since the irregularities of geologic structure and lithologic texture would seem to defeat the practical application of mathematical principles.

It is nevertheless of interest to formulate the variables influencing oil flow through the reservoir rock, if only to develop the relationships existing between them. A notable effort toward this end has been made by King[9] and

[8]Hardy, W., and Nottage, M., "Studies in Adhesion," Proceedings of the Royal Society of London, Vol. 112A, p. 62-76, (1926).

Slichter[10] of the U. S. Geological Survey. King performed an important series of experiments in which the resistance to the flow of water through sands of varying grain size and porosity was determined. Slichter, cooperating with King, developed mathematical formulae expressing the relationships existing between the several variables influencing flow, and later[11], by experimental methods, determined the constants and exponents which made his formulae practically serviceable. In an exhaustive analysis of Slichter's data, supported by additional research, El Difrawi[5] has developed a more useful form of Slichter's original equation. Without burdening the reader with the somewhat intricate mathematical transpositions involved in the development of this formula, it will be simply quoted in its final form. The formula expresses the relationship of variables influencing the flow of oil through a cylindrical column of sand.

If q is the discharge in gallons per minute,

p is the effective pressure expressed in feet of water,

d is the effective diameter of the sand grains in millimeters,

s is the cross-section of the sand column, in square feet,

u is the absolute viscosity of the oil in poises,

L is the length of the sand column in feet, and

o is the porosity of the sand, expressed in per cent, then:

$$q = (0.383 \times 10^{-6}) \times \frac{p \times d^2 \times s \times o^{3.3}}{u \times L} \ldots\ldots (3).$$

The flow of oil through the reservoir sand may be thought of as occurring through a great number of cylindrical sand columns, for each of which we might compute the volume of oil flowing with the aid of formula (3). The total flux to the well may be determined from this equation by a process of integration. Mr. R. S. McIntyre,[12] in a programme of research conducted under the direction of the writer, finds that the result of such an integration would be an equation having the general form:

$$P = \frac{C \times Q \times V}{T \times D^2 \times O^{3.3}} \times \text{Log}_{10} \frac{L}{R} \ldots\ldots\ldots (4)$$

In equation (4),

P is the pressure loss in feet of water,

Q is the quantity of oil produced in barrels per day,

V is the absolute viscosity of the oil in poises,

T is the thickness of the productive sand in feet,

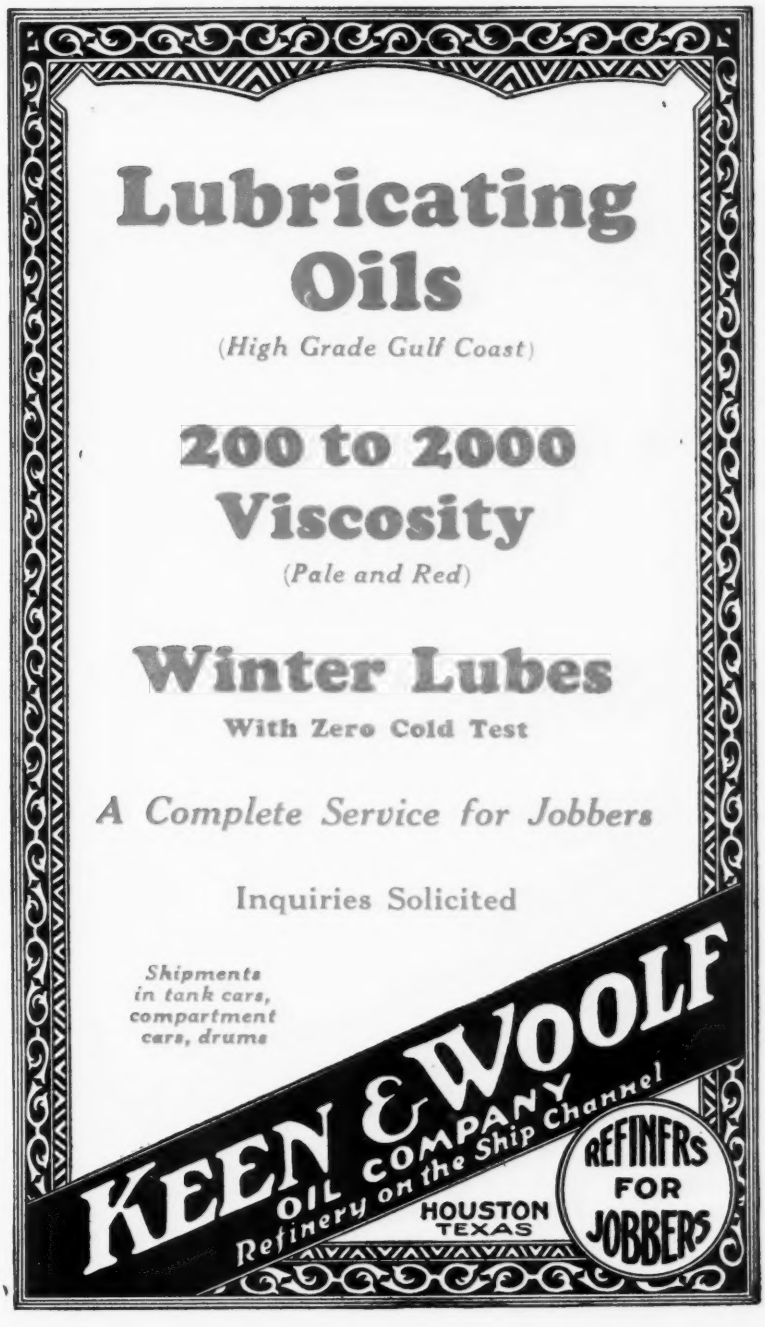
---

[9]King, F. H., "Principles and Conditions of Movements of Ground Water," U. S. Geol. Survey, 19th Annual Rept., Part 2, (1897-98).

[10]Slichter, C. S., "Theoretical Investigation of the Motion of Ground Waters," U. S. Geol. Survey, 19th Annual Rept., Part 2, (1897-98).

[11]Slichter, C. S., "Field Measurements of the Rate of Movement of Underground Waters," U. S. Geol. Survey Water Supply Paper 67.

[12]McIntyre, R. S., "A Study of Factors Influencing the Under-ground Drainage of Oil Sands," Thesis for Master's Degree, University of California, 1924.



LUBRICATION

"Friction, Lubrication, Fats and Oils", by Emil P. Dieterichs, is an inexpensive little book that contains valuable information on the manufacture of lubricating oils, solid lubricants and greases, together with numerous formulas; modes of testing oils and the application of lubricants.

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D is the effective diameter of the sand grains in millimeters,

O is the percentage porosity,

L is the radius of drainage of the well in feet,

R is the radius of the well through the productive sand, in feet, and

C is a constant.

It should perhaps, be pointed out, that these equations are applicable only to conditions in which the oil is "dead," that is, without occluded gas bubbles. They do not include the additional pressure losses resulting from the distortion of gas bubbles and in overcoming capillary "drag."

While such formulae are of doubtful practical utility, they are nevertheless of value in demonstrating the relative effects of the several variables on oil flow. For example, formula (4) shows that the flow of oil from the reservoir sand into a well varies:

(a) Directly as the effective pressure,

(b) Directly as the thickness of the productive sand,

(c) Directly as the square of the mean diameter of the sand grains,

(d) Directly as the three and three-tenths power of the sand porosity,

(e) Inversely as the absolute viscosity of the oil, and

(f) Inversely as the logarithm of the value of the ratio of the drainage radius of the well to the radius of the well. This is equivalent to saying that the rate of production of the well decreases as the distance over which the oil is to be moved increases, and increases as the diameter of the well increases.[13]

No discussion of the mathematical and physical principles governing the flow of oil through sands would be complete, without reference to the work of Mr. S. C. Herald. We have already had occasion to refer to some of Mr. Herald's conclusions, but the writer again wishes to call the attention of the reader to the wealth of material relating to our present topic that is embodied in Mr. Herald's articles.[14]

Rate of Oil Flow Varies with Distance From the Well

CONSIDERATION of formula (3), covering channel flow, shows that the pressure loss—which is a measure of the sand resistance—is directly proportional to the rate of flow; and with a given rate of flow, doubling the pressure doubles L, the length of the sand column, or the distance over which the oil will flow. When we consider radial flow on the other hand, such as is characteristic of oil flow through a reservoir sand toward a well, it is apparent that a very different condition exists. The rate of flow through the flow channels is not constant, but increases as the well is approached. Different flow

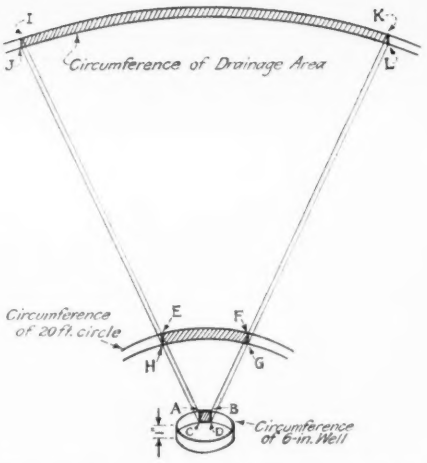

Fig. 6—Horizontal wedge-shaped segment of drainage area of a well, illustrating increase of flow cross-section with distance from the well

channels impinge upon each other and merge, necessitating more rapid movement of the fluids near the walls of the well than at remote points.

The writer has shown that the rate of flow of the oil in the reservoir sand varies inversely as its distance from the axis of the well.[13] Consideration of the Figure 6 will demonstrate the essential truth of this statement. In this figure, a horizontal, wedge-shaped segment of the drainage area of a well is shown. Let it be assumed that the well is six inches in diameter, and that it is effective in drawing oil from a circular area 600-feet in diameter, with the well as its center. Let it be assumed that the area ABCD, intercepted by the segment on the walls of the well, is one-inch square. It is apparent that the area EFGH intercepted by the same segment on a cylinder 20-feet in diameter, having the axis of the well as a center, would be forty times as large; that is, it would intercept an area of 40-square inches.

Since approximately the same quantity of oil must flow through each cross-section, it is clear that the oil is flowing forty times as fast at the wall of the well as it is at a distance of ten feet from the well axis, and the pressure loss would vary proportionately. In section IJKL, on the circumference of the drainage area, the area intercepted by the segment is 1200-square inches, and the flow is theoretically zero. Because of the extremely low velocities of flow in the outer half of the drainage area, the pressure loss is negligible.

Figure 7, developed with the aid of formula (4), shows that the greater part of the pressure loss in moving oil through the reservoir sand to a well is lost within ten feet of the walls of the well. This results from the greater velocity of the oil in the vicinity of the well. Knowledge of this fact suggests that, if we could be content with a lower rate of recovery and were to restrain the rate of flow of oil through the sands, the wells would drain larger areas and would ultimately produce a greater quantity of oil. Producing oil through the neck of a funnel is a very inefficient process at best, but if we must do it in this way, restriction of the rate of flow should increase the efficiency of recovery.

Conclusion

THIS article presents the principal known facts concerning the forces which are responsible for the retention of petroleum in reservoir rocks. The mode of operation and effects of capillarity, grain adhesion and sand friction in limiting the rate of oil flow and efficiency of recovery, have been briefly explained. This paper, together with the first two articles of this series, concludes a brief study of the factors influencing the drainage of oil from reservoir rocks into wells, insofar as they have been disclosed by recent literature and research. The topics discussed in these three articles are of fundamental importance in determining appropriate methods of well control and operation, and in devising and applying more efficient methods of oil recovery; topics with which we shall be concerned in later articles of this series.

The next paper, which will deal with the influence of back-pressure in securing increased efficiency in oil recovery, will appear in an early issue of National Petroleum News.

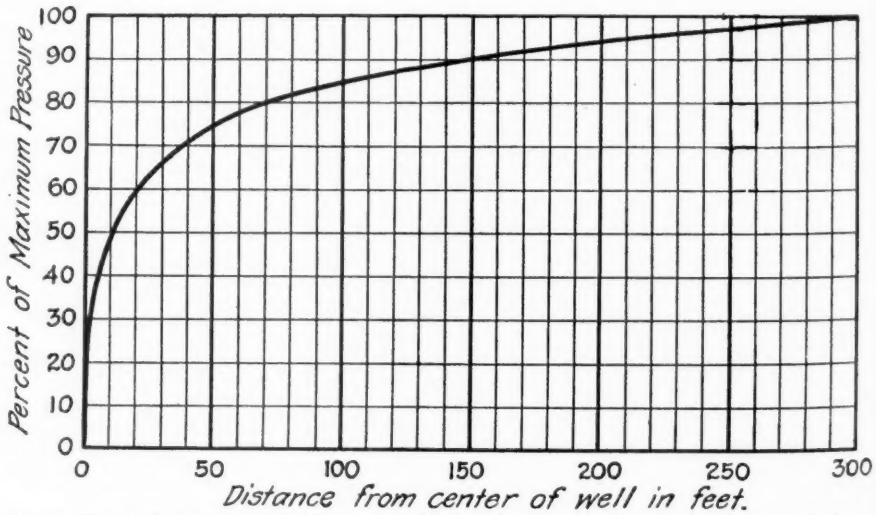

Fig. 7—Graph showing pressure loss of oil flowing through sand into a well over a drainage radius of 300 feet

[13]Uren, L. C., "Increasing the Production of Petroleum by Increasing the Diameter of Wells," Trans., Amer. Inst. Mining & Metall. Engrs., Feb., 1924.

[14]Herald, S. C., An extended series of articles extending through the 1925-6-7 issues of the Oil and Gas Journal.

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Jobbers Oppose Gas Tax Increase in Penna.

HARRISBURG, PA., Feb. 5.—The unanimous adoption of a resolution opposing increases in the gasoline tax in Pennsylvania was effected at a meeting of the Independent Petroleum Marketers of the Middle Atlantic States Jan. 25 at the Elks Club Hotel in Philadelphia, according to E. Walter Hudson, secretary.

The resolution which will be introduced into the state legislature provides for a law which would prevent the legislature from increasing the present 2-cent state tax, such as is now being sponsored in Ohio by Peter Witt, Cleveland councilman.

Other changes which the Independent marketers seek are: an allowance for outage and other losses; collection of the tax by the wholesaler and jobber rather than the retailer; reimbursement of the oil companies who collect the tax sufficiently to cover collection costs; co-operation of the association in collection of the tax was pledged.

Principal speakers at the meeting were: T. A. Peck, lubrication engineer of the National Petroleum Marketers Association, Chicago and M. S. Tarner, chief of the gasoline tax division of Pennsylvania. R. C. Paul, president of the Middle Atlantic jobbers association, presided.

Power Men to Meet in Chicago

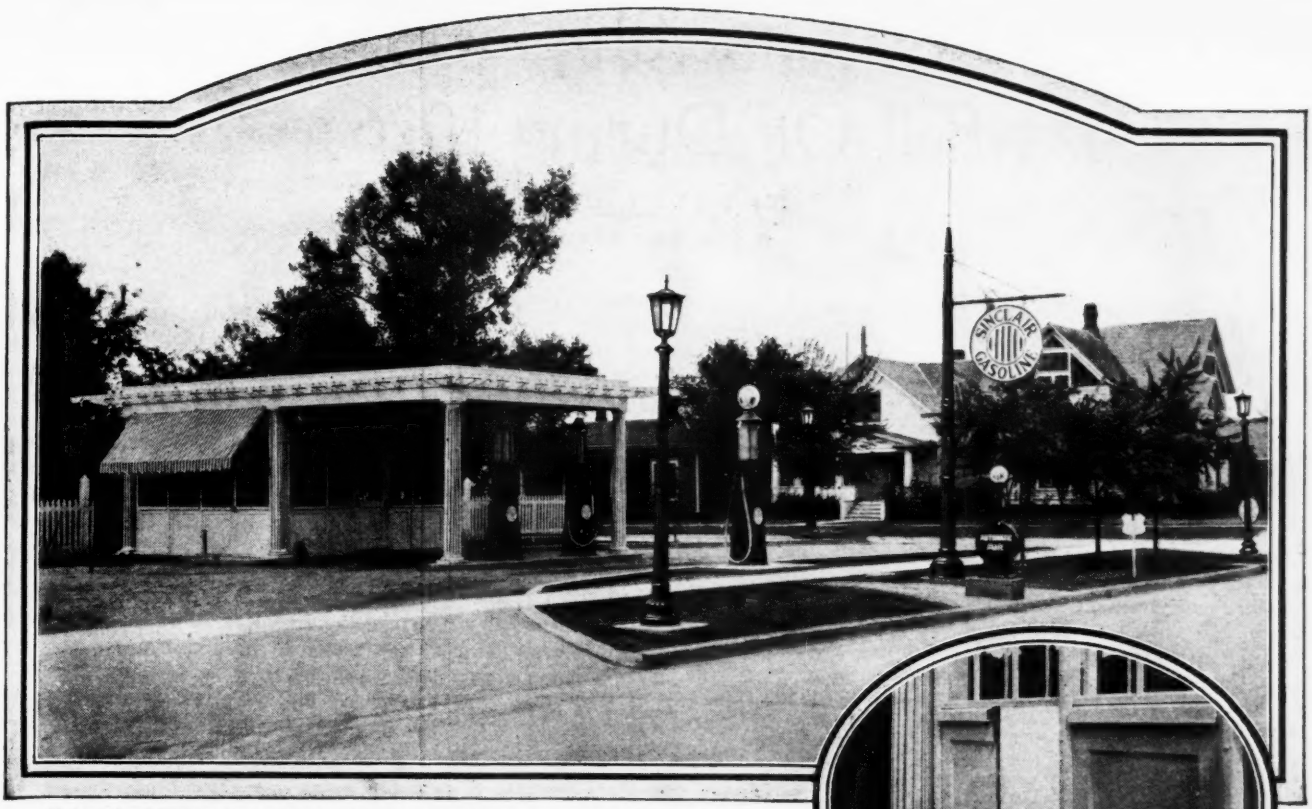
CHICAGO, Feb. 5.—The second Midwest Power Conference will be held at the Coliseum in Chicago, Feb. 15 to 18, inclusive. This conference is sponsored by the local sections, regional and professional divisions of the American Institute of Electrical Engineers, American Institute of Mining Engineers, American Society of Mechanical Engineers, National Electric Light Association, Western Society of Engineers and National Safety Council. The general plan of the 1927 conference will be to deal with the larger aspects of power utilization in the field of industry. The fuel session in the afternoon of Feb. 17 will be of chief interest to the oil industry.

McClure Oil Is New Ohio Marketer

DAYTON, O.—The McClure Oil Co. has been organized here to market petroleum products.

Officers are: J. H. McClure, who has been district manager at Dayton for the past five years for the Sun Oil Co., Philadelphia, president; Virgil S. Knight, vice president; L. H. Vinson, treasurer; and M. C. Weir, secretary.

Previous to being district manager, Mr. McClure was for a number of years refinery salesman in Ohio and Indiana for the Sun company.



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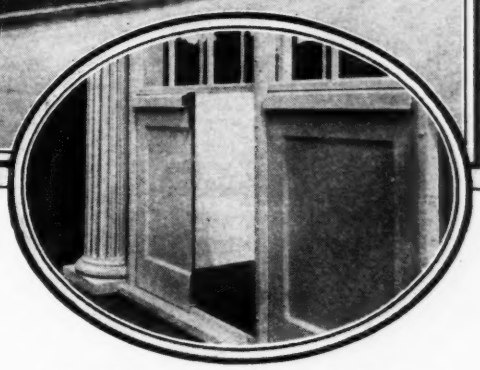

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Natural Gasoline Shipments to East Fell Off During 1926

By J. C. Chatfield
N. P. N. Staff Writer

TULSA, Feb. 5

SHIPMENTS of natural gasoline from the Mid-Continent field to the Atlantic seaboard showed a marked decrease in 1926.

Two companies alone lost more than 2000 cars of eastern business, according to figures presented at New York in a recent hearing before Examiner Keeler of the Interstate Commerce Commission. Similar large losses were shown in shipments of natural gasoline to Canada, Pennsylvania, Ohio, Indiana and Illinois.

Traffic managers for the Chestnut & Smith Corp. and the Phillips Petroleum Co., the two largest manufacturers of natural gasoline in the Mid-Continent field, gave detailed figures on their shipments for the past three years. These figures have been combined into one statement and segregated into groups showing general destination areas in Table No. 1.

These two companies shipped 5660 cars of natural gasoline in 1925 to refiner consumers in New York state, New Jersey and Massachusetts. In 1926 this business dropped to 3187 cars. In 1925 the same companies shipped 2281 cars to refiners in Ohio and Pennsylvania and only 1585 cars in 1926. Shipments to Indiana and Illinois plants were 1876 cars in 1925 and 868 cars in 1926. Shipments to Canadian refineries totaled 1717 cars in 1925 and 792 cars in 1926.

A BIG gain in shipments to refineries located on the Gulf coast of Texas and Louisiana was shown. In 1924 the two companies shipped 5609 cars to the Gulf, in 1925 shipments jumped to 9909 cars and in 1926 this was nearly doubled again, totaling 15,548 cars.

Discussing the situation at the Interstate Commerce Commission hearing at New York, D. E. Buchanan, vice president of the Chestnut & Smith Corp., showed that with a freight rate of 4.72 cents per gallon from Breckenridge, Texas, to Bayonne, N. J., refiners have been forced either to discontinue use of the commodity or use it at a loss.

In 1925 the average price of U. S. Motor gasoline f. o. b. Bayonne was 12.78 cents per gallon. The average price of Grade A natural gasoline delivered at Bayonne was 16.35 cents per gallon. In order to use natural gasoline refiners on the Atlantic coast were forced to pocket a loss of 3.57 cents per gallon on each gallon of natural gasoline blended with the refinery product and sold as U. S. Motor.

Increasing production of natural gasoline in 1926 coming at a time when eastern refiners were reducing their takings of the material from Mid-Continent manufacturers, kept natural gasoline prices lower during the past year. The average price of Grade A delivered at Bayonne in 1926 was 13.55 cents per gallon while U. S. Motor gasoline f. o. b. Bayonne brought an average price of 12.45 cents per gallon, almost the same price as in the previous year. The loss was 1.10 cents per gallon on natural gasoline blended with U. S. Motor.

DURING the entire two year period there were only two months during which natural gasoline could be bought in the Mid-Continent and shipped to Bayonne for blending at a profit. That was in June and July, 1926. The profit then was only a little over two tenths of a cent per gallon. In October, 1925, the loss was at its greatest point for the two years, approximately 6½ cents per gallon.

Prosperity or depression in the natural gasoline market appears to hinge very largely on a steady flow of natural gasoline to consuming centers in the east. While it is true that the withdrawal of any support from the natural gasoline market affects it radically and quickly due to the lack of facilities for storage in the industry, the eastern buying support probably has been the most important factor in the market.

Since early fall, for example, consumption of natural gasoline in the Mid-Continent area has been increasing rapidly due to the fact that more and more refiners are building up the gravity of their gasoline to 60-62 or higher to compete with the special advertised brands. The special brands themselves have been made up with the use of natural gasoline in most instances.

But while consumption was increasing in the Mid-Continent field, refiners in the east were reducing their purchases. This was particularly true about Jan. 1 when a number of contracts ran out. They were not renewed and the gasoline did not continue to move to the east on spot business.

NATURAL gasoline may be said to have started skidding when the contracts expired. At that time the price of Grade A in Breckenridge was 9¾ cents per gallon. Today Grade A is bringing 7½ cents per gallon at Breckenridge, a drop of 2¼ cents per gallon or 23 per cent of the former selling price. Grade C was hit even harder. At the first of the year it was selling at 8⅝ to 8¾ cents per gallon while today it is down to around 6 cents per gallon and some material is known to have moved at 5¾ to 5⅞ cents per gallon, a drop of nearly 3 cents per gallon or 31 per cent on the former selling price.

To some extent the demand for finished refinery gasoline and the price being obtained by refiners has a bearing on the natural gasoline market. And January has seen, as usual, a restricted movement of refinery gasoline and lower prices. U. S. Motor gasoline at Group 3 refineries, however, has fallen only approximately three eighths of a cent per gallon or 4 per cent of its former value as compared with 23 to 31 per cent for natural gasoline.

During the past few days eastern refiners have begun to show some interest in Mid-Continent natural gasoline again. Several substantial orders have been placed with the result that the natural gasoline market has shown faint signs of strength.

It is to protect the eastern outlet that Chestnut & Smith and Phillips are asking the Interstate Commerce Commission to consider natural gasoline as an unfinished product requiring blending at a refinery, give it a proper estimated weight of 5.5 pounds per gallon and fix a system of rates without reference to the rates on finished refinery gasoline to be shipped to ultimate consumers.

While the tremendous increase in natural gasoline shipments to the Gulf coast indicates the movement of substantial quantities of natural gasoline by coastwise steamer to the east, manufacturers realize that they are losing business which they require to make a profit on their production and conserve the available gasoline content of natural gasoline being produced in this area.

Table No. 1

Destination of Natural Gasoline shipments of two of the largest Mid-Continent Manufacturers 1924 to 1926. All figures are tank car loads.

	Number of Cars		
Destination Group	1924	1925	*1926
Oklahoma	634	524	674
N. La-Ark.	630	810	865
Kansas	2,691	2,311	1,659
N-C. Texas	406	590	747
Coastal La-Tex.	5,609	9,909	15,542
Ind.-Ill.	1,526	1,876	868
Ohio-Pa.	1,475	2,281	1,585
Rocky Mtn.	377	146	314
South-Eastern	379	734	171
N. Y.-N. J.-Mass	1,987	5,660	3,187
Canada	1,159	1,717	792
Miscellaneous	193	117	193
	17,066	26,675	26,597

*Shipments of one company are for the first 10 months only in 1926.

Texas Co. Increases Yield From Cracking Stills by Automatic Control

By Paul Truesdell
N. P. N. Staff Writer

CLEVELAND, Feb. 4

ASK almost any refiner what is the most vital factor in the success of his business, from the operating standpoint and he will probably answer high yields of products particularly, of gasoline. And he will probably go on to say that high yields must be obtained at low cost if the refinery is to meet competition and prosper. To obtain these results is a matter of good operators. Good equipment, of course, is important but it by itself is of little value. Skillful handling of the equipment and careful control of the processes is indispensable if the best results are to be obtained.

It is likely that many a refiner in going over his books and operating statements at the end of the year has been surprised to find that he did not get the percentage yield over the 12 months that he thought he was getting. Most refineries, of course, check their yields constantly. The control chemist determines in the laboratory the percentage of gasoline that should be obtained from the particular crude or stock on which the plant is running, and tries to hold the stillmen up to that yield.

And if the statements and reports for the year do not show an average yield that is up to the determined point, the man responsible for the operation of the plant at a profit is going to wonder why. A good many refiners have made up their minds that one of the big reasons for failure of the plant to get the maximum yield of gasoline consistently is variation in still conditions, such as temperature, which is next to impossible to avoid in manually controlled stills.

The crude on which the plant is running, or the charging stock, is carefully analyzed in the laboratory; experimental runs are made which determine what are the most advantageous temperatures to run for each product. The stillmen are given these temperatures and told to maintain them. The stillman, as a rule, is a fine fellow. He likes his job and he does the best he can to carry out his orders. Like all the rest of us he is human. Like all the rest of us he has his bad days.

SOMETIMES when he is not quite up to par he fails to keep a close eye on his stills. Maybe he lets the temperature of a still run up, with the result that material is carried over that shouldn't go into that cut. Perhaps it is caught in time and diverted to a slop tank from which later it has to be re-

LUIS DE FLOREZ
Inventor of the automatic temperature controller for stills adopted by The Texas Co.

run at more expense of time and fuel and equipment—at a loss.

Perhaps, still worse, it goes into a car or several cars at the loading rack and the first time the refinery manager finds out about it is when some jobber out in Iowa or Minnesota or Wisconsin or Georgia wires in angrily (collect) that the car is not up to specifications. More trouble, delay, expense and perhaps lasting ill will. And very likely the car is finally sold at a loss.

Or if the stillman does not keep up his fire and lets the temperature drop too low he fails to get off all the gasoline in the first still, later stills have to do some of the first still's work and the whole mess perhaps has to be rerun and the gasoline yield in the end is less than it should have been.

WHEN there was a more comfortable margin, on the average, between the price of crude plus manufacturing cost and the tank car price of the gasoline at the refiner's plant, a slight loss in yield was not nearly so important as it is now. For several years the margin has been gradually but steadily tightening so that even the smallest savings became important.

And in the past few months, with the increasing demand by the jobbing trade, urged on by the individual motorist, for a highly volatile gasoline, the matter of yield becomes still more important. When a refiner is cutting a 60-62 gasoline or better instead of a 58-60 naturally his yield is somewhat lower. Any further reduction of that yield, that can be in any way avoided, hurts that much more.

Automatic temperature control has been worked out for bubble towers and reflux towers. A thermostat actuated by the temperature in the top of the tower, starts pumps spraying cooling oil into the tower or shuts the pumps off as the temperature conditions demand or opens and closes bypass valves that regulate the flow of cooling oil in other types of control equipment.

But on stills automatic control of temperature has not become general. In fact, until recently, we have never seen any plant where it was used.

MINDFUL of the importance of holding still temperatures, particularly those of cracking stills, as nearly uniform as possible in order to get the best possible yield of gasoline, The Texas Co. has taken over the rights to the De Florez automatic still temperature control. This instrument, which is applicable to oil or gas-fired stills, controls the temperature by regulating the amount of fuel flowing to the burners.

This device has been in service for some time and is the result of nearly 10 years experimental work. The first commercial installations have been made, during the last year, on Holmes-Manley units at The Texas Co.'s West Tulsa plant and the rest of the stills there are being equipped with it. The cracking stills at the Port Arthur plant are also to be similarly equipped immediately and the company plans to use the control device on all of its Holmes-Manley stills and to license its use to other refiners.

The control is the invention of Luis De Florez, a consulting refinery engineer of 2 Rector st., New York City and is thus described by him. The system comprises a controller, actuated by a thermocouple, a control valve governing the flow of fuel to the burner system.

In the Holmes-Manley stills the thermocouple is installed in the oil near the outlet of the heating coils and registers changes in the temperature of the oil in a controller which may be set at any desired temperature.

The controller is operated by a small independent motor, using either alternating or direct current. This motor operates a mechanism which produces a series of electrical contacts when the temperature departs from the desired point, the contacts becoming longer in duration as the variation in temperature becomes greater.

THE contacts energize, through a relay, two small motors that are mounted on the control valve itself, this

valve being in the fuel line to the furnace. These two motors are connected in parallel and operate in the same direction during the contact period. One of the motors effects temporary corrections which last for the period of contact and ceases acting when the controller is in balance and remains inoperative as long as the still is at correct temperature.

The second motor effects permanent correction or change in the valve setting which is dependent on the length of time and direction the first motor is in operation. The joint effect of the two motors is to arrive at a setting which will balance the quantity of fuel to the duty of the still and maintain the balance by constant checking.

The valve itself is so arranged as to compensate for fluctuating pressure in the fuel supply line and the corrections which it makes are effected in definite increments of pressure in the burner line which is always constant for given corrections. Adjustments are provided for time lag of the furnace and for different duties and classes of equipment.

THE effect of the De Florez control is to make the operation of the still "dead beat." There is no "hunting" or fluctuation on the temperature recording chart which stabilizes the operation of the still to a remarkable extent.

Once the control is adjusted, the still under ordinary conditions, including changing weather and so on, can be held at times with no appreciable variation for hours and will maintain the temperature within five degrees week in and week out. Little attention is required and the human element with its liability to make mistakes is practically eliminated.

The control system, according to the inventor, stabilizes the entire operation of the still. It gives a better product because the temperature is maintained absolutely at the most favorable point as determined by tests and it gives a higher yield for the same reason. Mr. De Florez says, also, that in the operation of a cracking still of most types the length of runs would be probably increased because the temperature could be kept close to the average with no "peaks" which so often start the formation of coke in the tubes. It is the occasional overheating of the tubes that accelerates coke deposit, thus shortening the runs.

MR. DE FLOREZ points out that the temperature control would be useful in case of fire. If a tube in the cracking coil splits, spilling oil into the furnace, the fuel supply is cut to pilot size automatically. The device also saves fuel, due to the maintenance of more constant conditions in the fire box.

With regard to automatic control in general, Mr. De Florez states as follows:

"The last few years have seen a great change in refining methods particularly in the fact that the older intermittent processes are being abandoned for continuous operation. In continuous operation of any character it is necessary to correctly proportion the rates of each element entering into the process and the greater the capacity of the equipment the greater the necessity of accuracy and reliability of control.

"It will be obvious to anyone in the refining business that refinery equipment of today has been developed to a greater extent than the control of its operation and that manual control for apparatus handling thousands of barrels a day of oil can hardly be considered satisfactory.

"THE desirability of automatic control has never been doubted and will become in time a necessity. Its use has been delayed, however, by the fact that it has not been considered seriously and the attempts to utilize automatic devices in the oil industry have been more or less haphazard. Lack of knowledge on the part of instrument makers as to the use to which the apparatus was to be put in the oil industry and the corresponding lack of knowledge on the part of petroleum engineers as to the characteristics of instruments have brought about some discouraging failures.

Automatic control of any process, especially those involving control of temperature, is extremely difficult and should be considered a major part of the design of equipment and treated with as much consideration as the design of the equipment itself.

"There is no part of refinery equipment where more returns can be obtained per dollar invested than in the application of automatic control devices. It is perfectly possible, for instance, in the case of a cracking plant to increase the yields and the length of runs, and to decrease fuel consumption, the formation of coke, the heating surface repairs, by an accurate control of temperature.

"IF a cracking unit cost, let us say, $200,000, and the capacity of gasoline output from a given charging stock increased only 1 per cent which is a very conservative estimate, the productiveness of the unit will be increased, let us say, 1/40th. The additional cost of automatic temperature control apparatus for each cracking unit is about $2000. Thus we may add about 2½ per cent to the capacity and productiveness of the unit by an expenditure of $2000, which is obviously only a fraction of the normal cost required to obtain proportional increase by increasing the size of the unit.

"It is my belief that in time all continuous operations will be controlled automatically and that refinery design will be modified to cooperate with the use of standard controls. This will centralize the control of refinery operations to a greater extent and maintain closer relationship between plant operation and laboratory conditions.

"The use of automatic control as far as the oil industry is concerned, is very much in its infancy and the development of suitable apparatus requires highly specialized experience both in refinery operations and instrument design. Accurate automatic control is difficult to obtain and much time can be wasted by the fact that problems of this nature appear to be far simpler than actually found to be the case.

"To obtain the real benefits from automatic control, it is necessary to effect control of a process with greater accuracy and reliability than by hand. Only until the effect of control of this character is actually observed is it possible to conceive of the benefits which will be available in the future.

"It is to be hoped that refiners will view the use of control equipment seriously and consider it as an important part of refinery equipment, not as a "gadget" which can be bought for a few dollars and pinned on to a piece of apparatus after it is finished with the hope that it will function properly."

Milham Corporation Opens Texas Office

Staff Special

HOUSTON, Feb. 4.—District headquarters for central north Texas have been opened at Breckenridge, Stephens county, by the Milham Corp., in which the John Hays Hammond interests predominate. The company is active in Wilbarger and Shackelford counties, besides extending its operations elsewhere in the general region. A. G. Beard is general superintendent at Breckenridge; Sid Myers, drilling and production superintendent; and G. M. Young, material accountant.

Sterling Named On Texas Highway Commission

HOUSTON, Feb. 4. — Ross Shaw Sterling, former president of the Humble Oil & Refining Co., and more recently engaged in city building enterprises at Houston, has been appointed to the Texas board of highway commissioners. The appointment was made by the incoming governor, Dan Moody, who took office about a week ago. Cone Johnson, lawyer, of Tyler, was also appointed a highway commissioner. A third commissioner is yet to be named. Besides his industrial interests, Sterling is principal owner of the Houston Post-Dispatch.

RUSH RUN, O.—The Brilliant Oil Co. will add storage tanks for gasoline and lubricating oils, according to W. C. Hudson, Jr., President.

The company is also considering purchase of half and one gallon cans to be used by motorists for carrying an extra supply of gasoline and for emergencies.

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Theory That Non-Conductivity Causes Knock Not Borne Out by Known Facts

By Dr. George Granger Brown
Department of Chemical Engineering, University of Michigan

Editor National Petroleum News

YOUR challenge (page 21, Dec. 29, 1926, issue) has been accepted. The first report of Gasin coming to my attention was a brief article by Dr. G. Grote in Chemiker-Zeitung, page 289, April, 1926, under the title "Gasin, a new working substance for internal combustion motors." This article points out the disadvantages in the use of tetraethyl lead in being poisonous, and of iron carbonyl in depositing iron oxide causing valve and lubrication troubles, and asserts that two chemists, Tern and Hloch, have determined that the cause of engine knock is due to the electrical nonconducting properties of the fuel. To prove this contention the following statements are made:

"A known anti-knock is a mixture of gasoline, benzol and alcohol. It is evident that the 'knock' is less when using this mixture than when using unblended gasoline. The reason for this is that fuels made of the above mixture include water which increases their conductivity.

"For another example compare gasoline and benzol. Gasoline has a strong tendency to knock, while benzol does not possess this property. Benzol absorbs water readily, gasoline on the other hand does not.

"LEAD tetraethyl, likewise iron carbonyl, scarcely affect the electrical conductivity of the fuel. For this reason these additions are afflicted with failure, because they remove only the detonation knock and not the knock due to auto ignition, not mentioning at all other disturbing secondary phenomena. The above mentioned chemists have discovered certain substances, through the addition of which they accomplish at the same time an increase in the power of the explosion of the working substance.

"Through this new discovery the abnormal high pressure waves will be avoided and detonation will be eliminated. Further, premature auto ignition (preignition) of the explosive mixture will be made impossible.

"Summary. This new discovery—

1. Increases the volatility,
2. Further refines the fuel,
3. Eliminates the 'detonation knock' and the 'auto ignition knock',
4. Is absolutely non poisonous,
5. Does not clog the valves nor deposit dirt in the oil,
6. Increases the power of the explosion,
7. Makes possible the construction of motors of smaller dimensions and less weight possessing greater efficiency."

The challenge to which Dr. Brown refers is a note published in connection with a National Petroleum News article by Dr. H. Grote, on "Gasin" setting forth the theory that knocking of an automobile engine is a function of electrical conductivity or non-conductivity of the fuel.

This article, translated from a German paper, was published on page 21 of the Dec. 29 issue. This publication did not issue a challenge, merely an invitation to American technologists who have done more work than anybody on the knock, to express their opinions of the German's theory.

We publish Dr. Brown's reply herewith, and hope others will express their views.—Editor.

The article in Chemiker Zeitung for Aug. 14, 1926, page 603, referred to in National Petroleum News, is practically the same article translated from Petroleum Zeitschrift by Paul Truesdell.

HOW the addition of any dope can increase the volatility, power, and efficiency of a fuel, prevent fuel knock and preignition and "at the same time through the splitting off of oxygen cause an increase in the explosive power and an after-refining of the fuel through which the gum forming compounds and other impurities are removed" is, I must admit, beyond my experience.

Overlooking the apparently extravagant claims made for this panacea, Gasin, consider simply the statements made concerning fuel knock:

1. "When the explosion is completed too early, the cylinder must overcome a very powerful resistance in reaching top dead center which causes the piston to work backwards and the operation of the engine is irregular and jerky. This kind of operation is accompanied by the noise which is called detonation."

According to this statement, no knock or "detonation" would be observed if the spark were retarded so as to ignite the charge after top dead center. This is not the case. Many fuels will knock violently in high compression engines with the spark so retarded.

2. "If the fuel which is used in the engine is a complete non-conductor as, for instance, gasoline, the fuel will become charged with electricity generated by friction in the intake manifold when being sucked into the engine. The result is that when ignited by the spark the combustion, on account of the electric charge, follows instantly and the detonation knock occurs.

"Platinum electrodes were installed in opposite positions under the engine head (not hood) and insulated from the walls of the engine. A dry battery, resistances, interrupter and a suitable galvanometer were connected across these terminals."

WHENEVER a knock occurred a deflection of the galvanometer was observed. The assumption is tacitly made that the deflection of the galvanometer indicated an electric charge on the fuel particles which caused the knock and not that the deflection of the galvanometer was caused by the knock. The latter condition may be as near the truth as the assumption made.

If the engine knock is due entirely to a static charge of electricity on the fuel particles caused by friction in the intake manifold, why are the following facts true?

1. The knock is not so evident in cold engines and manifolds when static charges are more easily produced at low temperatures.
2. The knock is partially eliminated by efficient cooling of the exhaust valve, which has no effect on conditions in the intake manifold.
3. The knock disappears at high altitudes in airplane engines, although altitude has no effect on fuel conductivity.
4. The knock is prevented by allowing more clearance above the piston.
5. The knock is decreased or eliminated by partly closing the throttle.

DR. GROTE'S hypothesis "that the fuel knock depends directly upon the electrical conductivity of the fuel" seems inadequate to explain any of the above facts. For this reason the above hypothesis should be applied with caution. Electrical properties of fuels and electrical phenomena may be directly connected with detonation as cause or effect, but our experience has established facts which cannot be explained solely on the basis of electrical properties of fuels, particularly as the electrical properties of the fuels have not yet been established by experimental data but seem to have been assumed.

As I have freely criticized the hypothesis put forth by Dr. Grote, it is

only proper that a constructive suggestion be made in the form of another hypothesis.

Our work at the University of Michigan on gaseous explosions leads to an entirely different hypothesis concerning the probable mechanism of engine knock. The experimental work, started about six years ago, is still under way. Some of our results and conclusions appear in three articles on "Gaseous Explosions" in the February issue of Industrial and Engineering Chemistry. The following is a brief abstract of these articles as published in the Michigan Technic.

What Makes An Engine Knock?

By Geo. Granger Brown and Geo. B. Watkins

SINCE 1905 the demand for gasoline has increased faster than the increase in production of petroleum. Accordingly the petroleum refiners have resorted to the most obvious means of supplying this increasing demand for their most volatile product, that of including more of the less volatile material in the gasoline fraction. The continuation of this practice led to poorer engine performance and particularly to a very unpleasant "knock" in more efficient engines of higher compression ratio.

This "knock" is metallic in sound, but is not due to mechanical impacts, as was first suggested.

The "knock" is characterized by an intense pressure of extremely short duration and a marked decrease in the power output of the engine.

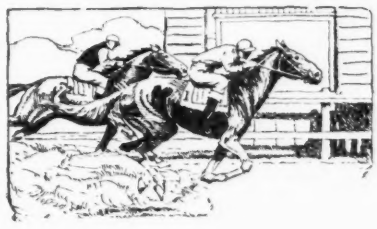
The reason for this decrease in power may be explained by analogy. If it is desired to push a car or other load up a hill, the application of a steady pressure or push is more effective in moving the load than a series of impacts, such as blows from a sledge, in which the pressure developed is many times that exerted by the steady pressure, but of such short duration that no work is accomplished.

Similarly with the explosion in an internal combustion engine, if it exerts a steady pressure on the piston by normal combustion, the maximum power will be developed; if the explosion "knocks," a large part of the potential energy is spent in developing an intense momentary pressure which does not persist long enough to do work or develop power.

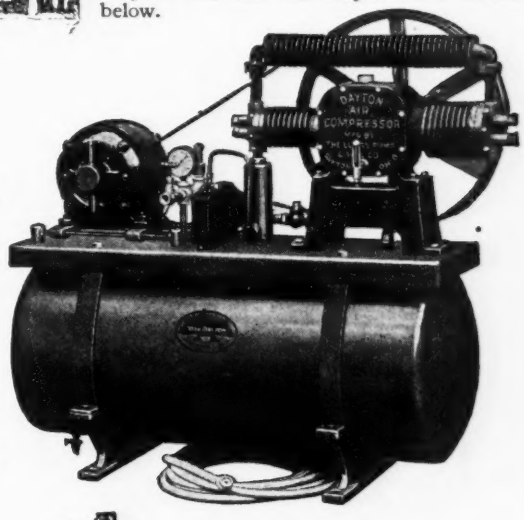
It was found that retarding the spark largely eliminated this objectionable noise and the suggestion was made that the "knock" was due to pre-ignition. Further experience showed that the removal of carbon from the surfaces of the combustion chamber made it unnecessary to retard the spark to eliminate this objectionable sound, which was then referred to as a "carbon knock." During the war an intensive study was made to find more and better fuel suitable for use in the high compression aeroplane engines.

It was then found that some fuels

The Two That Are "Favorites"



In the race for compressor supremacy, just as in the running races on the track, two factors combine to mark the favorites—Speed and staying powers. Measured by these factors, the two favorites for first place in the "Compressor Stakes," are the Dayton G., and the Dayton E-2 shown below.



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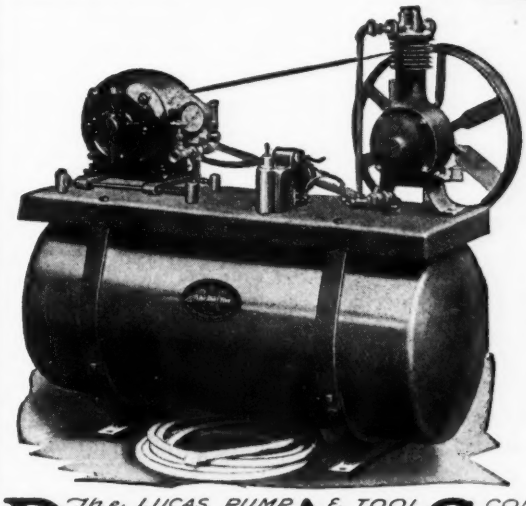

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National Petroleum News, 807 Caxton Bldg., Cleveland, Ohio

would "knock" more readily than other fuels used under the same conditions. Accordingly the "carbon knock" was rechristened the "fuel knock," as it is now known.

The startling discovery a few years ago that the addition of a small amount of "dope" to gasoline practically eliminated the "fuel knock" shook the petroleum refiners firm conviction that gasoline is gasoline regardless of source of treatment, heredity or environment.

SINCE that time much work has been done to design engines that would reduce the knock, to find sources of "anti-knock" gasoline, and to treat gasoline so as to reduce the knocking tendency, but relatively little effort has been expended to determine the actual cause of the "knock."

Although many important facts concerning engine knock have been discovered, and much progress made in reducing the knock, real progress is limited until the real cause of the knock is known.

Continued research on the "fuel knock" seemed to indicate that the characteristics of the "fuel knock" were similar to those possessed by the "detonation wave" set up in a progressive homogeneous explosion as occurs in long tubes, previously discovered and investigated by Berthelot, Le Chatelier, and Dixon. For this reason the fuel knock is frequently referred to as "detonation," and some investigators go so far as to assume that the fuel knock is due to initiation of a true detonation wave such as occurs in long tube explosions.

AN inventory of our present knowledge indicates that we know more about the engine knock than we do about explosion in bombs. For example consider our knowledge of the effect of initial temperature. Every observer of engine knock has reported that an increase in temperature of the explosive mixture increases the tendency of that mixture to cause engine knock. This evidence is so conclusive that it may be taken as a fact. Observers of explosions in bombs do not agree as to the effect of initial temperature. In a written discussion of the paper by Woodbury, Lewis, and Canby, Dixon says: "If the initial temperature of the gas is raised 100°C. this rise is not added to the flame temperature." In discussing some pressure time curves of the explosions of petrol-air mixtures obtained by Fenning at the National Physical Laboratory, Ricardo says: "An increase of 101°C. in the initial temperature means a similar increase in the flame temperature."

In order to settle this controversial point and to determine the effect of initial conditions on bomb explosions an apparatus was developed which consists essentially in an explosion bomb equipped with the necessary optical pressure indicator for obtaining the time pressure curves, valves for charging the fuel and oxygen and nitrogen, and gauges for indicating the conditions of pressure and temperature before and after the explosion.

THE results of experimental work conducted in this bomb concerning the effect of initial temperature on the rate of rise of pressure of explosion clearly indicate that an increase in initial temperature above 167°F. invariably causes a decrease in the rate of rise of pressure and tends to eliminate the detonation wave. In mixtures containing an excess of fuel the greatest rate of rise of pressure was obtained when the initial temperature was 167°F. Either lowering or raising the temperature from 75°C. decreased the rate of rise of pressure. Mixtures containing an excess of oxygen did not show this maximum, but gave the greatest rate of rise of pressure at the lowest initial temperature. These results are in complete agreement with the results obtained by all previous investigators who conducted experiments over this temperature range.

The existence of a critical initial temperature giving maximum rate of rise of pressure serves also to explain the contradictory statements concerning the effect of initial temperature given above. These results may be explained as follows: If a volume of gas at 300° absolute is heated sufficiently to raise its temperature 300°, the absolute initial pressure is doubled. If a gas at 900° absolute is raised 300°, the absolute initial pressure is increased only one-third. All other factors being constant, the higher the initial temperature, the less will be the rise of pressure for a given amount of heat supplied to the mixture. The higher the temperature the more rapid is the chemical reaction and the heat is supplied faster. There are then these two factors. one decreasing the magnitude of the pressure rise with an increase of temperature, and the other increasing the rate of pressure rise with increasing temperature. When both of these factors are considered together, it is evident that there will be some initial temperature at which the rate of rise of pressure will be a maximum.

THE fact that an increase in initial temperature of the explosive mixture invariably increases the tendency of an engine to knock, and an increase in initial temperature above 75° C. invariably decreases the rate of rise of pressure and tendency to detonate in bomb explosions clearly indicates that the reaction occurring in the engine cylinder is decidedly different from the progressive reaction occurring in a bomb.

It has been known for some time that the condition of the surface of the bomb or tube has very slight effect upon the detonation wave developed in the bomb or tube explosion. It is also well known that the condition of the surface within the combustion chamber of an internal combustion engine has a very marked effect upon the engine knock. As a general rule sleeve valve engines do not knock as badly as the poppet valve engines. This difference is due to the fact that the exhaust valve operates at a very high temperature while the exhaust port in the sleeve valve engine is more efficiently cooled and operates at a much lower temperature. This fact has been verified by engine designers who have built engines with a single valve used as an intake and exhaust valve. In these engines the cooled mixture entering the cylinder through the same valve through which the hot exhaust gases pass out of the cylinder, cools this valve sufficiently to practically eliminate the engine knock.

The relative knocking tendency of different fuels has been investigated very thoroughly by Harry Ricardo in England, but until now no investigation has been made as to the rate of rise of pressure of different fuels exploded in bombs. This work was undertaken in the bomb with the results given in Table I.

TABLE I

Rate of Rise of Pressure of Different Fuels Exploded Under Constant Conditions in a Constant Volume Bomb

Fuel Used	Max. Rate of Rise of Pressure, Pounds Square Inch per Second
Normal Hexane	47,500
Normal Heptane	61,500
Normal Octane	63,700
Benzene	63,000
Toluene	56,500
Xylene	47,000
Methyl Alcohol	52,000
Ethyl Alcohol (Absolute)	39,500
Amyl Alcohol	48,000
Ethyl Ether	200,000

Comparison of these data indicates that the rate of rise of pressure in a bomb explosion (a progressive homogeneous reaction).

1. Increases with molecular weight in the paraffin series.
2. Varies inversely with the number of methyl groups added to the benzene ring in the aromatic series.
3. Is approximately the same for normal octane and benzene and for normal heptane and toluene, and for normal hexane and xylene.
4. Is about the same for the higher alcohols as for the corresponding paraffin hydrocarbons.
5. Is exceedingly rapid for ether.

IT is well known that the aromatic hydrocarbons do not knock in internal combustion engines so readily as do the normal paraffin hydrocarbons. When these data are interpreted with this fact in mind, it is evident that the rate of rise of pressure in a progressive homogeneous explosion as occurs in a bomb cannot be the sole factor determining the tendency of a fuel to detonate in an internal combustion engine. The same conclusion is suggested by data previously reported on the effect of initial temperature on the rate of rise of pressure.

In 1921 Woodbury, Lewis and Canby suggested that the engine knock might

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be due to some form of auto-ignition of the unburned explosive mixture ahead of the flame initiated by the spark. If this suggestion is correct, the intensity of the knock would vary directly with the amount of unburned gas ahead of the flame when the auto-ignition temperature of the unburned gas was reached.

As the unburned gas ahead of the flame is heated largely by adiabatic compression due to the expansion of the burning gas, the amount of unburned gas ahead of the flame when the auto-ignition temperature is reached varies directly with the rate of expansion of the burning mixture. The rate of expansion depends directly upon the rate of rise of pressure. Therefore, the amount of unburned gas ahead of the flame when the auto-ignition temperature is reached varies directly with the rate of rise of pressure of the explosive mixture.

THE amount of unburned gas present when the auto-ignition temperature is reached will also vary inversely with the auto-ignition temperature. If the auto-ignition temperature is high, the gas will have to be compressed to a greater degree before this temperature is reached.

In Table II the maximum rate of rise of pressure is given in column 2 and the auto-ignition temperature on the absolute scale as determined by Moore is given in column 3. Column 4, obtained by dividing column 2 by column 3, represents the estimated knocking tendency of these fuels based upon the theory just outlined. The highest useful compression ratio for these fuels as determined by Ricardo is given in column 5. As the knocking tendency varies inversely as the highest useful compression ratio it should be possible to estimate the highest useful compression ratio of any fuel by using the inverse ratio of the data given in column 4 with the highest useful compression of one fuel. The highest useful compression ratio estimated in this way using the ratio 7 for toluene as a basis of comparison is given in column 6.

ALTHOUGH the estimated highest useful compression ratio is not in absolute agreement with the ratio determined by Ricardo, considering the different sources and purity of the fuels used and the assumption of the simple relation between rate of rise of pressure and auto-ignition temperature, the agreement between the estimated and experimentally determined values is surprisingly good and justifies the hypothesis that the tendency of fuels to knock in internal combustion engines is largely determined by the rate of rise of pressure and the auto-ignition temperature.

The important effect of hot surfaces on engine knocking is further evidence justifying the hypothesis that the knock is due to the auto-ignition of the unburned part of the mixture that is compressed against the hot surfaces by the progressive reaction initiated by the spark. Extensive work on airplane engines at the government factory at Philadelphia has shown that the pistons failed at that part of the combustion chamber furthest removed from the spark plug indicating that the intense combustion accompanying the high rate of rise of pressure occurs only in that part of the mixture compressed against that part of the combustion chamber opposite the spark plug. When two spark plugs are used at opposite sides of the combustion chamber the pistons fail in the center and the knocking is more intense. These facts indicate that the extremely rapid compression of the gases in the central part of the combustion chamber due to the initiation of two explosions from opposite sides intensifies the knock.

This hypothesis is adequate to explain all of the known facts of engine knock. As an airplane rises, the engine knock decreases. This is due to the fact that the pressure at the higher altitudes is less than at sea level and the rate of rise of pressure is decreased due to the lower initial pressure. It has been shown that tetraethyl lead decreases the rate of rise of pressure in bomb explosion. This fact is adequate to explain the effect of tetraethyl lead in decreasing engine knock.

TABLE II

Rate of Rise of Pressure and the Auto-Ignition Temperature as Determining Knocking Tendencies

1 Fuel.	2 Maximum rate of rise of pressure.	3 Auto-ignition temp. in degrees Kelvin (Moore).	4 Column 2 divided by Column 3.	5 Ricardo's Highest Useful Compression Ratio.	6 Estimated Highest Useful Compression Ratio.
Normal Hexane	47,500	560	84.8	80% Hexane 5.1	5.36
Normal Heptane	61,500	554	110.8	97% Heptane 3.75	4.1
Normal Octane	63,700	548*	116.0	. . .	3.9
Benzene	63,000	893	70.5	6.9**	6.45
Toluene	56,500	869	65.0	99% Toluene 7	7.0
Xylene	47,000	757	62.2	7	7.3
Methyl Alcohol	52,000	779	66.7	5.2**	6.8
Ethyl Alcohol (Absolute)	29,500	668	59.1	98% Ethyl Alc. 7.5	7.7
Amyl Alcohol	48,000				

*This value for Octane was estimated and not determined by Moore.
**Pre-ignition occurred before audible detonation.

Refiners Will Fuel Home Burners As They Have Motor Cars

TULSA, Feb. 4

TWO new thoughts on domestic burning oil were advanced recently by H. W. Camp, general superintendent of refineries, Empire Refineries, Inc., Tulsa.

The first thought was no use can be found for oil that is superior to furnishing comfort, health and happiness in American homes.

H. W. CAMP

The second was that, due to the growing demand for highly volatile gasoline by the motoring public, it is likely that part of the fraction now going into motor fuel will, in the near future, be available as furnace oil.

He pointed out that the trend of the cracking industry to use heavier fuel and crude oils, will leave the lighter cuts for household oil burner.

He told the oil burner manufacturers that they should not worry about a sure supply of fuel for their home heating installations because the supply is not at the moment in sight. He pointed out that, when the automobile industry was young, the refineries were getting only about 19 per cent of gasoline from their crude. That, however, did not discourage the automobile manufacturers. They went ahead, multiplying the number of cars by millions.

And now the refiner generally, Mr. Camp said, is getting around 38 per cent of gasoline from his crude. He believes that history will repeat itself in the case of the oil burner.

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The new Birmingham is manufactured in 5 and 10-gallon sizes; and it comes completely equipped with foot valve, standard metal-lined hose, hose nozzle, and lock. Wired for electrical illumination. It is made of pressed steel throughout, with steel supports inside; and its pump cylinders are of seamless brass tubing. A handsome, durable pump.

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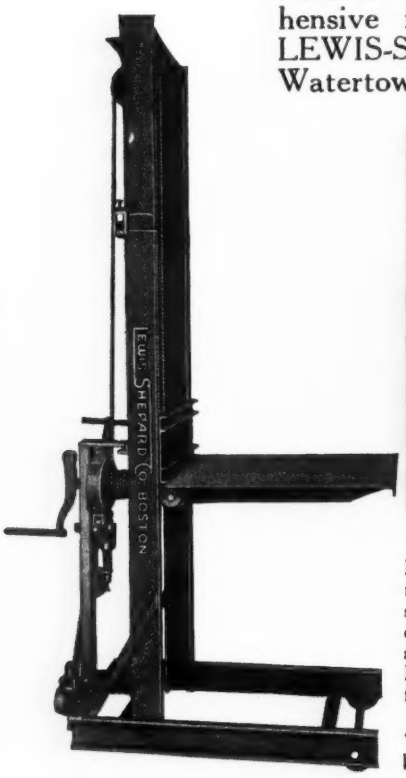

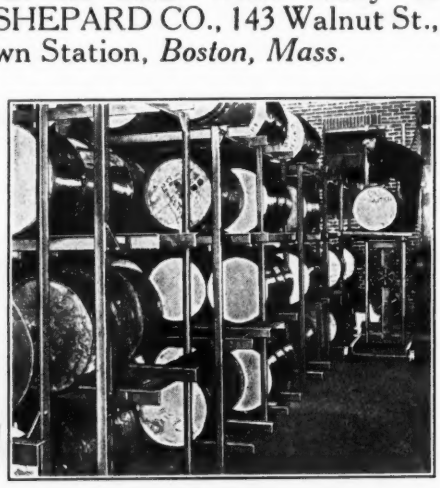

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National Petroleum News

830 Caxton Building **Cleveland, Ohio**

Bulletin Gives History of Petroleum Geology

TULSA, Feb. 4

Bulletin No. 40-G of the Oklahoma Geological Survey, recently issued, is entitled "Petroleum Geology in Oklahoma." Its author is Sidney Powers, chief geologist for the Amerada Petroleum Corp., Tulsa. The pamphlet consists of 24 pages, with foreword by Dr. Charles N. Gould, director of the Oklahoma Geological Survey. Copies may be obtained by application to Dr. Gould.

The book naturally divides itself into two parts, the first dealing with the history of the beginnings and growth of the geological profession in Oklahoma, and the second with the relation of geology to oil production.

In the historical section, H. B. Goodrich, of Tulsa, is credited with being the first geologist to engage in commercial petroleum work in what is now Oklahoma, he having worked in the vicinity of Ardmore in 1903, on exploration work for the Sante Fe Railway. His work there resulted in the discovery of the Wheeler field, Carter county, in 1904.

The first geologist to open an office in Tulsa, according to Mr. Powers' history, was L. L. Hutchinson, who started consulting work here in the spring of 1911, although he had been working as a petroleum geologist since 1906. Roswell H. Johnson is reported as the second geologist to devote his time exclusively to petroleum exploration in Oklahoma.

After mentioning these and many other geological pioneers, Mr. Powers traces chronologically the growth of geology in Oklahoma, bringing it up to the point where any oil company without a geological department was hopelessly old-fashioned. He states that the first oil company geological department organized in Tulsa was that of Guffey & Gillespie, organized Jan. 1, 1913, by E. W. McCrary. Mr. McCrary had been engaged in consulting work in Marietta, O., since 1908. He afterward became chief geologist for the Tidal Oil Co., resigning in 1925 to become an Independent operator.

In discussing relation of geology to production, Mr. Powers touches upon the various outstanding fields developed since the beginning of geological work in Oklahoma, mentioning the failures as well as the successes recorded by the scientists. He traces the growth and subsequent decline of surface mapping and illustrates how this has been followed by an era of detailed sub-surface study. The review gives an interesting history of Wilcox sand development in Oklahoma, and brings out also the steadily increasing depths of wells. In 1913, he states, the deepest dry hole in the state was the "California" well in the Wheeler field, drilled in 1909 to 3612 feet. In 1914, a small oil well was brought in at Bristow at depth of 3467 feet, the record for the state at that time. In 1916, the state's deepest well was 3485 feet, this being the discovery of the Ingalls field, west of Cushing.

Visiting Around the Refineries

By Paul Truesdell

National Petroleum News

Increasing the Automobile Compression Pressure

THE refiners are doing a pretty good job in increasing the average anti-knock quality of the gasoline offered the American motorist to judge by the estimate made by C. F. Kettering, head of research of the General Motors Corp. Mr. Kettering stated the opinion recently that the average compression pressure of the cars being put out by all manufacturers in 1927 is about three per cent above the average compression pressure of 1926 cars.

If the average compression pressure of 1926 cars was 80 pounds, as has been estimated, a three per cent increase in compression means 2.4 pounds. Such an increase in compression demands gasoline of considerably higher anti-knock value. And the car manufacturers would not dare to put out such cars unless they were certain that the average gasoline available to every driver, would run that kind of car without knocking. Cars have to be built to run on the average gasoline and not on the best gasoline that is obtainable to a limited extent.

History of Cracking Told in Simple Style

LELAND L. REBBER, superintendent of cracking operations at the Los Angeles refinery of the Union Oil Co., has written a clear and interesting article on the art and history of cracking oil, which is published in the January issue of the Union Oil Bulletin. In a review of 1926, in the same issue of the bulletin, it is stated that important additions and improvements to Union Oil refineries were made last year, including the installation of the Edeleanu sulfur dioxide process for treating kerosene and of four 2000-barrel Cross cracking units. Taking on the marketing of Ethyl gasoline is also cited as one of the important forward steps of the company in 1926.

Not Using Powdered Coke Burners

EUGENE P. KIEHL, power engineer of the Atlantic Refining Co., writes in to say that his company is not using any burners for powdered coke. A story published on page 48-M of the Dec. 15 issue of National Petroleum News seemed to give the impression that coke burners were being used in the Atlantic plant.

The story discussed the Peabody burner, which originally was designed to burn either gas or oil. Later developments, according to Mr. Peabody, are being worked out that will make a burner suitable also for powdered coal or coke. Twelve of these burners for oil or gas only are in use in the Atlantic plant, Mr. Kiehl says. None of the three-way burners are as yet in service, Mr. Peabody says.

Symposium on Motor Fuel Papers Available

REFINERS interested in the papers read at the gasoline symposium recently conducted at Massachusetts Institute of Technology under the auspices of the northeastern division of the American Chemical Society can get the complete papers by sending 20 cents to John A. Seaverns, 99 Broad St., Boston, it is announced.

A Study of Heat Transfer for Refiners

L. B. McMILLAN, chief engineer of Johns Manville, Inc., has made an important contribution to the literature on heat transfer through insulating materials which should be of interest to every refiner who is faced with insulating problems. The work, which was prepared for presentation before a joint session of the American Society of Mechanical Engineers and the American Society of Refrigerating Engineers, arranged by the National Research Council at the annual meeting of the A. S. M. E. last December, has been put out in mimeographed form bound in a stout paper cover.

Besides reviewing the literature on the subject, Mr. McMillan has given his own theories and opinions, based on experience and investigation, and he sets forth mathematical formulae and methods for figuring the rate of heat loss through insulation from various shaped surfaces.

Correcting Error in Conversion Method

DR. ALFRED OBERLE of Kansas City who worked out the method for rapid conversion from Fahrenheit to Centigrade temperatures which was published on page 104 of National Petroleum News Jan. 26, writes in as follows:

"An error occurred in Scheme II, due to the fact that I forgot to make a cross over the minus sign, thus changing it to plus, all down the line from zero to 300 degrees. Scheme II should read as follows:

$(0x0.8) + (32+0) = 32$, etc. all down the line instead of as published:

$(0x0.8) + (32-0) = 32$."

Reference to the page and issue mentioned will show the error which is here corrected.

Committee on Technical Centralization at Work

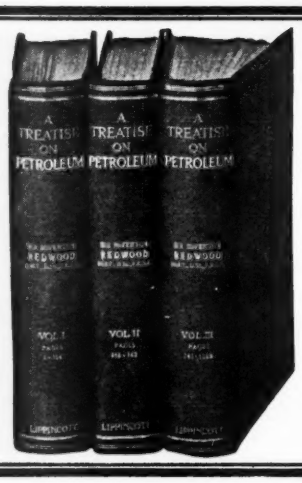
E. W. ISOM, chairman of the committee on technical relationships appointed by the American Petroleum Institute at the Tulsa meeting, states that the committee held a meeting Jan. 12 and will probably hold another within the next six weeks. The purpose of this committee is to study possibilities of centralizing the technical work in petroleum under the A. P. I., or in the hands of the industry itself.

Mr. Isom says the committee will be glad to give careful consideration to suggestions from anyone interested in the matter.

Holmes-Manley Units Going In On West Coast

TWO Holmes-Manley cracking units are under construction at the Watson, Cal., refinery of the California Petroleum Corp., W. E. Green, staff representative of National Petroleum News in Los Angeles, reports. These units will have a capacity of 2000 barrels a day each.

Construction is progressing rapidly and the units are expected to be in operation by April at the latest. These are the first Holmes-Manley units to be installed in California. Bernard O'Connor, manager of the refining department of the California Petroleum Corp. recently made an extended study for his company of all the cracking processes available.



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New Oil Station Construction

Bemidji, Minn.—Power Oil Co. will build bulk station here. Service station is also planned, also additional bulk stations, including one at Walker, Minn.

* * *

Peoria, Ill.—Sweney Gas & Oil Co. is erecting three service stations, one each at Minonk, Pontiac and El Paso, Ill. They will be open about Feb. 15.

* * *

Mason City, Ia.—Donnelly Service Inc., by J. E. and Daisy A. Donnelly, will conduct oil marketing busines and may build filling stations.

* * *

Grand Forks, N. D.—Peoples Co operative Oil Co., recently organized will erect several service stations soon.

* * *

North Platte, Neb.—The Texas Co. will build two filling stations here on Lincoln highway.

* * *

Unionville, Mo.—W. H. Forbes leases site for filling station for Standard Oil Co. of Indiana.

* * *

McCook, Neb.—John E. Spelts, 60 Main St., will build service station at Holyoke, Colo.

* * *

Council Bluffs, Ia.—L. L. Coryell & Son, Lincoln, Neb., will build service station here.

* * *

Wellington, Kan.—Clyde Stewart, proprietor of Motor Inn, will build filling station.

* * *

Kirksville, Mo.—Richardson Oil & Mercantile Co. will erect filling station next spring.

* * *

Kansas City, Kan.—William S. West 1801 Grandview Bldg., will build filling station.

* * *

Grady, Ark.—Benton-Miller Filling Station burned recently, is being rebuilt.

* * *

Little Rock, Ark.—E. L. Warren will build filling station on E. Third St.

* * *

Osakis, Minn.—Standard Oil Co. of Indiana will erect service station.

* * *

Edinburg, Tex.—Gulf Refining Co. will erect $5,000 filling station.

* * *

Dalton, Neb.—Fred and Rex Carey are erecting filling station.

* * *

Tulsa, Okla.—Marland Refining Co. will build service station.

* * *

Clinton, Mo.—Skelly Oil Co. to build filling station.

* * *

Falls City, Neb.—The Texas Co. will erect service station.

New Equipment for Plant Improvement

Personal Notes of the Manufacturers

National Petroleum News

Brooks Engineering Co., Los Angeles has announced a new hookup in the installation of flame arrestors on tanks, designed to prevent the freezing of condensate in the tubes of the flame arrestor and consequent clogging. The announcement says that in cold weather when tanks have to be steamed for pumping or dehydrating purposes, steam sometimes condenses and freezes in the arrestor hindering the breathing of the tank. The hookup provides for the installation of the flame arrestor inside the tank roof, toward the apex. This assures, according to the announcement, that the arrestor will be affected only by the inside temperature of the tank.

* * *

The Universal Oil Products Co., Chicago, has put out the "Dubbs Cracking Process Yearbook, 1925-1926." The introduction states the opinion of the company that cracking will soon be the principal source of gasoline. The book, which is printed on fine paper and well illustrated, gives the advertisements that have been run by the company in technical and trade papers and a list of company publications on various phases of cracking which may be had for the asking by those interested.

* * *

The Bessemer Gas Engine Co. held its annual sales convention in the Penn Grove hotel, Grove City, Pa., the home of the company, from Dec. 29 to Jan. 1. The first day was spent in the factory to give the field men an insight into the production end. The other days were devoted to business meetings. A banquet was held on the night of Dec. 29 and on the evening of Dec. 31 a dance was given.

* * *

The Walworth Co., Boston, has announced a new line of Class AA steel valves which are available for 400, 600 900 and 1350 pounds hot oil pressure at 750 F. The valves are trimmed with the company's Sigmalloy No. 351 for which superior qualities of heat and corrosion resistance and strength are claimed.

* * *

Jacob Meurer, president of the Meurer Steel Barrel Co., Inc., died Sunday, Jan. 23, at his home in New York. W. W. Share is vice president of the company, C. P. Burr is general manager, Andrew Meurer is secretary and C. H. Bolles, Jr., treasurer.

The A. Y. McDonald Manufacturing Co., Dubuque, Ia., has appointed Oil Men's Service & Supply Co., 142 Berkeley st., Boston, Mass., as its distributor in that territory.

The latter company has been organized by W. C. Leitch and R. M. Lull, both of whom are well known in the New England states. The company will handle the complete line of McDonald oil marketing equipment.

* * *

The Southwestern Engineering Corp., Los Angeles, has added two new models to its line of factory built natural gasoline plants. Type 100 is a 10,000 to 12,000 gallon plant and type 180 is a 15,000 to 20,000 gallon plant. Formerly the company made portables (Type 25) with a capacity of 2500 to 3000 gallons and recently came out with a semi-portable type 75 with a capacity of 7500 to 10,000 gallons per day.

* * *

The American Radiator Co., Buffalo, N. Y., is putting out a new boiler designed for domestic oil burning installations. The company is a large manufacturer of domestic heating equipment and in addition, manufactures Sterling condenser and refrigerating sections towers, preheaters, heat exchangers and other equipment used in refineries and gasoline plants.

* * *

General Electric Co. has put out GEA-571 describing a number of items in its line of arc welding accessories. These include hand shields for welders, helmet type shields protective colored glasses holders for electrodes, welding reactors, wire brushes and flexible welding cable.

* * *

William E. Simpson, Detroit, has put out a leaflet describing his variable speed reducing unit for use in regulating the speed of motors. The speed is controlled by setting a dial at the speed desired and this speed can be changed over a wide range while the motor is running.

* * *

George F. Hurt Engineering Corp., New York, has put out a booklet describing the Geyser-Action process for concentrating sulfuric acid from sludge.

* * *

The Parkersburg Rig & Reel Co., Parkersburg, W. Va., has put out a booklet describing its chain driven sand reels and bailing reels.

Emsco Derrick & Equipment Co. of Texas, Houston, of which S. P. Farish is president and L. R. McCollum general manager, announces an increase of its capital stock from $300,000 to $500,-000. It has just built two field stores at Isom, in the Texas Panhandle, and Odessa, in the west Texas territory, where stocks of steel derricks and derrick machinery will be carried. J. J. Long will be in charge of the West Texas store at Odessa, C. A. LaMothe will manage the Panhandle store at Isom.

* * *

Ingersoll-Rand Co. of New York has announced that the most powerful oil-electric tugboat has been put in service by the New York Central railroad for towing barges and car floats in New York harbor. The boat is powered with two Ingersoll-Rand type PR six-cylinder four-cycle solid injection 14 by 19 oil engines, each direct connected to a 270 kilowatt General Electric compound wound generator and a 30 kilowatt exciter.

* * *

The Gaso Pump & Burner Manufacturing Co., of Tulsa, reports two recent shipments of Gaso pumps to foreign fields, as follows: To Romana Americana Oil Co., at Halta Telejan, Roumania; several Gaso walking beam, piston power, and rodline pumps; To the Comodoro Rivadavia, Buenos Aires, Argentine: Three Gaso duplex steam pumps, Model 401.

* * *

Botfield Refractories Co., Philadelphia, announces that it has appointed the following distributors for its products: Southern Steel & Cement Co., Asheville, N. C.; Henry A. Petter Supply Co., Paducah, Kentucky; Columbia Supply Co., Columbia, S. C. and Spartanburg Mill Supply Co., Spartanburg, S. C.

* * *

Crouse-Hinds Co., Syracuse, N. Y. has just put out bulletins 220, 221 and 2097 which describe respectively the company's electric flashing beacons, Type B automatic variable timing switches and control cabinets, and "groundulets." The latter are designed to furnish protective grounding.

* * *

Union Carbide & Carbon research laboratories have recently put out a bulletin giving data on obtaining high strength welds in copper.

Our Industry—A Page of Facts and Observations

National Petroleum News

By Paul Wagner

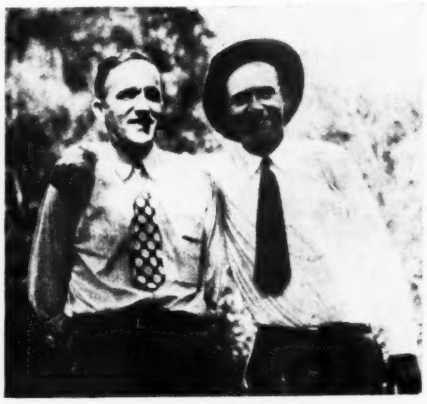
LOU WENTZ, of Ponca City, Okla., is recognized first for his citizenship and then for his industrial attainments. Not withstanding his phenomenal success as the head of a one-man company it is the individual himself who appeals to those familiar with his characteristics. The Oklahoma State Society for Crippled Children, which is performing invaluable services in rehabilitating humanity, is one of his pet hobbies. Recently he is credited with putting up approximately a million dollars in a cotton holding program to aid farmers in the southwest. Wentz, who at 45 is still a bachelor, lives in the quietest of apartments and has no personal servants. He was born in Mt. Vernon, Iowa, the son of a master blacksmith. After the death of his old partner, John J. McCaskey of Pittsburgh, the outstanding interests in the partnership were bought out by Wentz, who most of the time in recent years has held the distinction of having the largest individually owned oil production in Oklahoma.

* * *

PAYMENT of December oil royalties accruing to the University of Texas from its lands in the region west of San Angelo brought total receipts from this source to $5,169,203.46. Of the $182,066.62 paid on December royalties, $127,817.44 was received from the Big Lake Oil Co., and $54,249.18 from the Texon-Group I interests. These companies control Big Lake field development in Reagan county. University of Texas royalties from the University (Church & Fields) pool, in northeastern Crane county, have been small because of the few wells completed; also their size, the wells having averaged only about 100 barrels, initial production, at the present stage of development. University royalties, under an interpretation of the Texas constitution, may not be used for building purposes or other expenditures; the royalties go into a permanent fund and only the income derived from this principal may be spent. The money has been invested in government bonds drawing about 4 per cent interest.

* * *

W. M. RAY, superintendent of Texas gasoline plants of Magnolia Petroleum Co., who previously made his headquarters at Olden, Texas, in the Ranger territory, is now located at the Dallas headquarters office. Elmer Minter, formerly chief clerk in the producing department at Breckinridge, is now secretary to Mr. Ray at Dallas.



J. H. HESTERLY and SAM GLADNEY

THE picture appearing on this page shows two widely known young men in land division work of the petroleum industry. They are J. H. (Jack) Hesterly (left) of the Louisiana Oil Refining Corp., Shreveport, and Sam Gladney (right) of the Sun Oil Co., at El Dorado, Ark. The picture was snapped at an oil industry gathering in Texas several months ago when they had no reason to be concerned about competitive leasehold purchases. In addition to his land division work, Hesterly also has supervision of his company's scouting organization. Gladney also keeps his weather-eye on the Sun's scouting in Arkansas.

* * *

RAY E. KOLLAR, who had been connected with the Pure Oil Co.'s production engineering department at Tulsa until his resignation last November, is now located in Roumania as assistant general superintendent for the Standard Oil Co. He was accompanied to Europe by his bride, formerly Miss Arlene Hatch, who had held a secretarial position in the Pure's Tulsa office. Mr. Kollar was for two years with the Texas division of the Pure Oil Co., and last June was graduated from the Rolla School of Mines at Rolla, Mo.

* * *

SPECIALTY products of petroleum are frequently used for purposes the average person would not ordinarily associate with articles made from them. A paragraph in a recent issue of "Among Ourselves," inter - company house organ of the Standard Oil Co. of California, discloses that motion picture studios spray large quantities of Oronite Crystal Oil with compressed air to form artificial fog and smoke; shaved refined paraffin wax is used to represent snow.

THE prime purpose of an inter-company club in an industrial corporation is to foster community spirit and to mold into one big, happy family the personnel of the organization. Such a purpose has been restated in a letter to all non-members of the Humble club who are employed by the Humble Oil & Refining Co., and its subsidiary, Humble Pipeline Co. Included in the club's membership are employees ranging from those occupying the highest positions to those performing the lowliest and most humble tasks. The new president, William N. Finnegan, Jr., has announced a program that contemplates the making of 1927 the banner year of the Humble club's existence. Mr. Finnegan and other officers named at the annual club meeting early in January were elected by acclamation, as follows: President, William N. Finnegan, Jr.; vice-president, C. H. McNair; secretary, J. E. Corl; treasurer, H. E. McDonough; sergeant-at-arms, C. F. Leonard. The secretary was empowered to select an assistant and George W. Barry was chosen. A board of governors serving the club for 1927 include Henry K. Arnold, Miss Merlee Granbury, E. L. Fitzgerald, J. K. Vaughn, C. H. Carlisle, Tim R. Hodges, H. W. Bishop, Frank A. Watts, J. Ralph Mulvey, George W. Barry, Miss Evelyne Whitley and L. C. Ingram.

* * *

JAMES A. BERMINGHAM, late of the land department of the Simms Oil Co., Dallas, is now functioning as assistant division manager of The Texas Co., at Fort Worth, where he works with L. E. Barrows, division manager. Bermingham has made his home at Fort Worth since 1918, although much of his time has been spent in the San Angelo territory for the last two or three years. Ernest Wilson of Dallas has taken the place in the Simms organization that Bermingham vacated. In addition to Messrs. Barrows and Bermingham, the administration of The Texas Co's. activities at Fort Worth comes under D. O. Bayless, division land head, and Alan Bruyere, division chief geologist. Bruyere was formerly with The Texas Co. of Mexico, S. A., at Tampico.

* * *

LONE Star Exploration Co., recently formed by Wyoming interests, has announced location of its headquarters at San Angelo, Texas. Officers include I. N. Clay of Casper, Wyo., president, and L. F. McMahon, secretary. They were accompanied to San Angelo recently by Harry Adams, company manager, and G. S. Langstaff, Rocky Mountain drilling contractor.

* * *

A. B. ALSPACH, formerly connected with Rocky Mountain field operations of Prairie Oil & Gas Co., has been transferred to Borger, Texas, as Panhandle division production superintendent. He succeeds Frank Campion in the Panhandle, the last mentioned Central Texas division superintendent hereafter devoting his time to operations centering at Ranger, Eastland county.

And Now the AUTOMATIC (Self-Sealing) SHUT-OFF NOZZLE!

The BENNETT SEALOMATIC NOZZLE

You'll Be Using It Soon!

OIL Marketers everywhere tell us that the new Bennett Sealomatic Nozzle surpasses any other means for clean, fast dispensing of lube-oils.

A mere light upward touch of a measure, a bottle or a can opens the nozzle to the full flow of any fast-acting Bennett lube-oil pump. The instant a filled container is removed this remarkable nozzle shuts perfectly tight.

Regardless of the amount of pressure placed on a Bennett pump handle it is impossible to pump lube oil through this nozzle unless the operator opens it intentionally.

The Bennett Sealomatic Nozzle is a standardized Bennett product made under conditions of intensive specialization and vast volume production. It is simple, strong, durable and positive. It fits Bennett lube oil tank outfits, including High Boys, and all Bennett barrel pumps. Specify the Bennett "Sealomatic" Nozzle when ordering.

Optional on All Bennett Lube Equipment

Bennett Pumps Corporation
Muskegon, Michigan

"Symbol of Quality"

Branches and Warehouses at Strategic Points, Coast to Coast

Bennett Pumps Corporation
QUALITY BUILT
Bennett
Oil and Grease Equipment
Muskegon, Michigan.

PROFIT
What Is It?

Does it mean merely buying oil at one price and selling it at another? Supplying those who patronize you because they happen to, or because they think you are a fine fellow?

Profit is one of the most interesting and intriguing words in the English language, and to capitalize it you must sell not only yourself and your service, but some real, understandable reasons why the oil you handle gives the best service.

Jobbers handling Humble Oils know all of the reasons why people should buy their oils instead of other brands. They *believe* in these reasons themselves, many of them having been developed through experience. Consequently, their businesses are outstanding and profitable.

The Humble Oil & Refining Company operates no filling stations. Humble Products are sold at wholesale only. We can take care of your requirements in any quantity—in lithographed packages, drums, a carload or a cargo. We control every step in production and manufacture—from the wells to you.

Write, wire or phone for samples and prices.

Humble Oil & Refining Company

Houston, Texas

Producers - Pipe Lines
Refiners - Marketers

"Zero Cold Test Oils"

HUMBLE OIL & REFINING CO.
HUMBLE OILS
Reg US Pat Off
HOUSTON, TEXAS

Here & There

National Petroleum News

R. C. PAUL

President of Harrisburg Oil & Supply Co., Harrisburg, Pa., who has been elected president of the newly-organized Independent Petroleum Marketers of Middle Atlantic States, Harrisburg, Pa.

E. N. Klemgard, who has been with the research and development department of the Standard Oil Co. of California at Pullman, Wash., developing compounds and greases for the past four years, has resigned that position to become sales engineer for the Hearn Oil Co., Wilmington, Dela.

* * *

Seward Lincoln has succeeded C. V. Kebil at the Independent Oil Co., Dakota, Ill. Mr. Kebil has entered the furniture and undertaking business for himself at Sycamore, Ill., according to C. V. Smith, president of W. C. Smith & Co., oil marketer at Dakota.

* * *

A. A. Hodge, salesman at Evansville, Ind. for the Tide Water Oil Sales Corp., New York, recently returned to Evansville from that company's national sales convention held at Edgewater Beach Hotel, Chicago on Jan. 10, 11 and 12.

* * *

J. Alex Dingwall, Jr., has resigned as director, member of the executive committee and vice president of Seaboard Terminals Corp. and Seaboard Midland Petroleum Corp., New York.

* * *

Commissioner Max M. Fife, Blackwell, Okla., aside from operating the Fife Auto Service, is carrying on a $360,000 improvement to the city's light plant, water-works and sewer system.

* * *

John Prichard, Geneseo, Ill., has succeeded W. F. Butler as manager of the Mutual Service Stations Co., Inc., of Geneseo.

Myer M. Taxman, of the Atlas Petroleum Co., Kansas City, Mo., and Chicago, has disposed of his interest in that company to J. J. Taxman, who will continue as the company's managing head, according to George S. Allee, president of the Missouri Oil Men's Association, Kansas City.

Mr. Taxman has a wide acquaintance in the Mid-Continent territory, being well known in refining and marketing branches. He has not as yet announced future plans.

* * *

Harry W. Cohen, secretary and treasurer of the Rogers Gasoline Co., Inc., Uniontown, Pa., plans to fly to Mitchell field, N. Y. and Bolling field, Washington, some time in January, in the interests of Burgess field, the government flying field at Uniontown. The Rogers company has been supplying gasoline and oil to the government since the Burgess field was established.

* * *

H. Oehlenschlager, formerly field supervisor for the Shaffer Oil & Refining Co., Chicago in its Home Oil Co. division at Fargo, N. D., is now with the W. H. Barber Co., Minneapolis, and will call on jobbers in North Dakota, as well as those in a part of Montana and southern Canada.

* * *

Otto Koch, President of the Kendall Refining Company, Bradford, Pa., has hied himself to Florida for the remainder of the winter. He is at 116 14th Avenue, N. St. Petersburg.

* * *

E. B. Reeser, president of the Barnsdall Corp., New York City, and Mrs. Reeser sailed for Los Angeles on Jan. 27 on the steamer Mongolia.

* * *

F. A. Patient, salesman for the Pierce Petroleum Corp. at Lebanon, Ill. is back at work after a 10 days' sick leave.

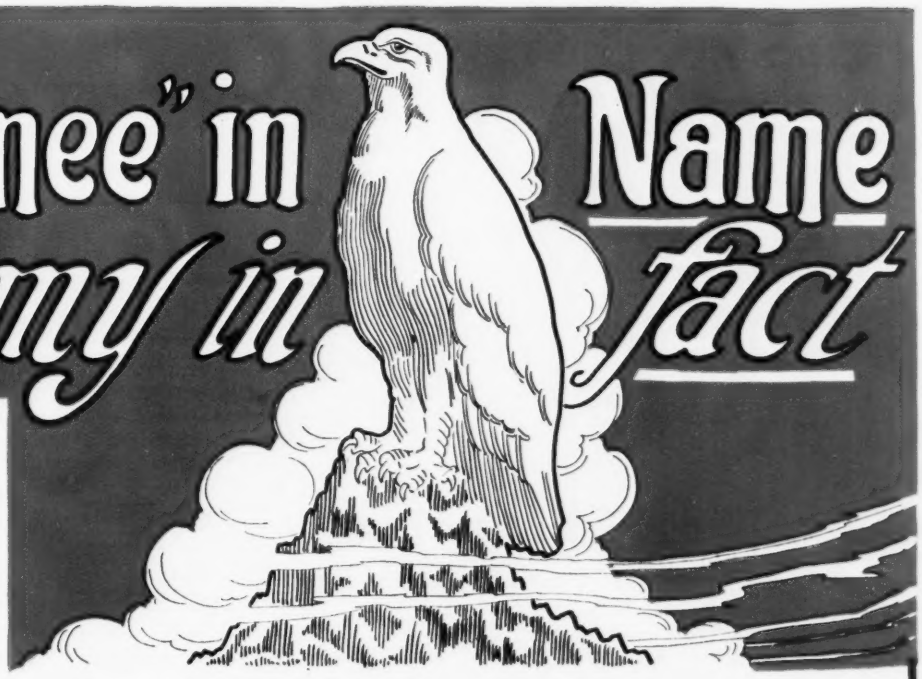
Junior Here and There

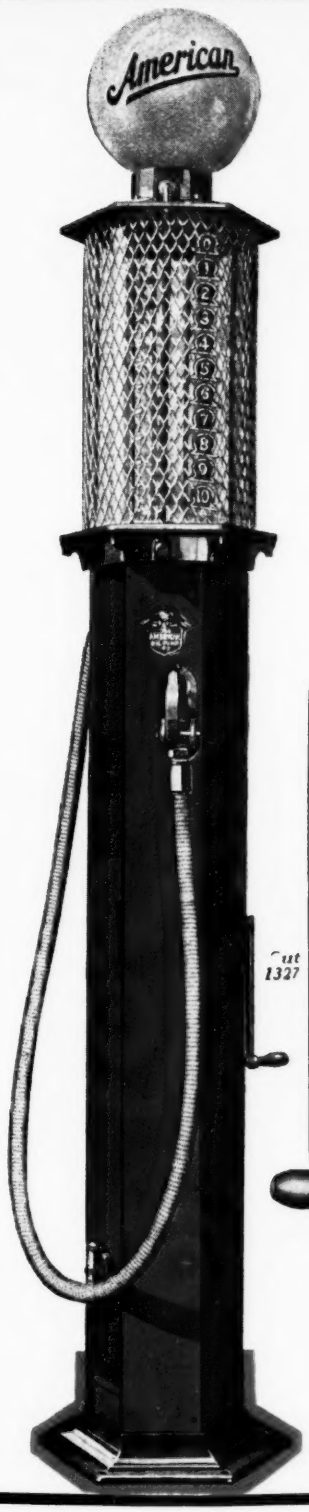
C. A. Hayman, manager of the Williamsport, Pa. and Jersey Shore, Pa. branches of the American Oil Co., Baltimore, Md., became a grandfather on Dec. 19, when a son was born to his daughter, Mrs. C. Gordon Reese. Mr. Hayman has the distinction of being a grandfather at the age of 38 years.

* * *

Edson Lockwood Mott, weight 7½ pounds, arrived at the home of Mr. and Mrs. E. L. Mott, Kansas City, Mo. on Dec. 29. Mr. Mott is sales representative for Deepwater Oil Refineries, Inc., Houston, Tex.

"Economee" in Name
Economy in fact





Cut 1327

ALL the way through . . from small initial investment and simplicity in removing from one location to another, till you begin to figure your pump cost by the year . . the American "Economee" Pump speaks a message of "Economee" that anybody can understand.

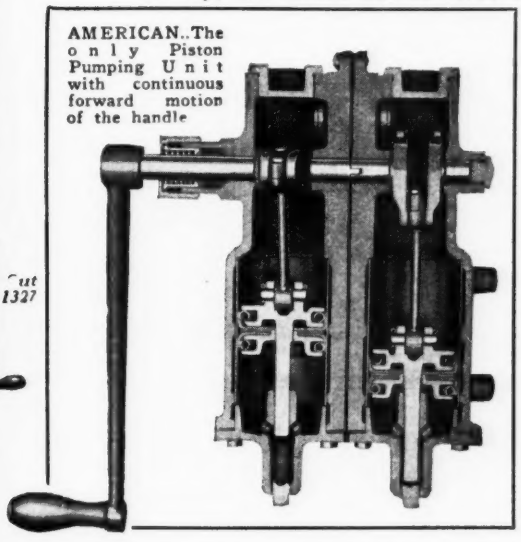
Practically no upkeep expense on the piston pump unit . . any necessary minor repairs can be easily made. Small wonder that the

American Economee Pump

has created a real sensation, and that the trade agrees with us that this pump is the BIGGEST hit ever produced at such an inviting price.

VISIBLE TYPE pump . . with 10-gallon container . . stationary overflow . . sight measurement. The cabinet is exceptionally staunch and sturdy, due to the use of three upright supports properly braced. The pump, suction and return lines are securely fastened to brace, preventing vibration when pumping. And the "Economee" embraces use of a high-class, dirt-proof, rust-proof, rapid, accurate piston pump unit such as we have featured on higher-priced American pumps.

AMERICAN..The only Piston Pumping Unit with continuous forward motion of the handle



MANY OTHER OUT-STANDING FEATURES

of the American "Economee" Pump . . such as speed, simplicity, unusually attractive appearance . . all commend it to oil men as THE popular-priced pump of 1927. Mail coupon below for complete information.

THE AMERICAN OIL PUMP & TANK CO.

1713 Dalton St. Cincinnati, O.

THE AMERICAN OIL PUMP & TANK CO.
1713 Dalton St., Cincinnati, Ohio

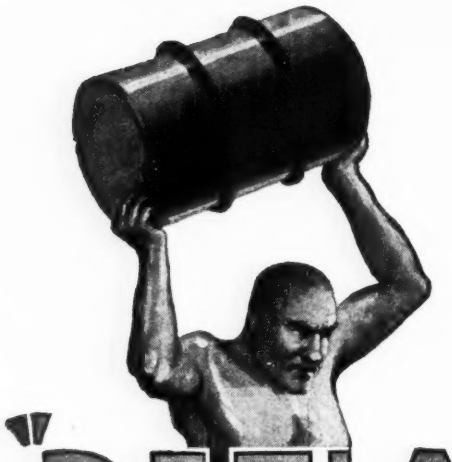
Please send me full information and prices on:

Cut 1427 (wet hose, with Underwriters' label)
Cut 1327 (wet hose, no Underwriters' label)
Cut 1425 (dry hose, with Underwriters' label)
Cut 1325 (dry hose, no Underwriters' label)

Name .....

Address .....

City ..... State .....



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INTEGRITY

Buy your barrels at as low a figure as you can, but be sure you are getting full value.

Specifications cover the materials put into a barrel but they do not apply to the men behind the barrel.

Almost anybody can roll up a sheet of steel, weld it together, stamp their initials and the gauge steel on the end and call it a barrel.

But it takes integrity as well as skill to turn out a shipping package like the Defiance Steel Barrel.

You get your money's worth in a Defiance Steel Barrel.

THE AMERICAN STEEL PACKAGE CO.

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Help Your Salesmen

to acquire a working technical knowledge of the selection, application and use of lubricants, by ordering for each one a copy of the PRACTICE OF LUBRICATION, by T. C. Thomsen.

It discusses the origin, nature and testing of lubricants and every phase of lubrication engineering.

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NATIONAL PETROLEUM NEWS

825 Caxton Building Cleveland, Ohio

New Patents

Refining

Method of Refining Hydrocarbons.—Owen David Lucas and Ernest Lawson Lomax, Westminster, England, assignors to V. L. Oil Processes, Ltd., Westminster, England. Filed Apr. 30, 1924. No. 1,615,286.

Art of Pyrogenetic Conversion of Hydrocarbon Oils.—Frank A. Howard, Elizabeth, N. J.; Edgar M. Clark, New York, N. Y.; and James R. Carringer, Elizabeth, N. J., assignors to Standard Development Co. Filed May 23, 1921. No. 1,615,384.

Apparatus for the Distillation of Hydrocarbon Oils.—Max G. Paulus and Oswald C. Brewster, Casper, Wyo., assignors to Standard Oil Co., Whiting, Ind. Filed Feb. 27, 1924. No. 1,615,400.

Continuous Distillation of Crude Petroleum Oils.—Francis M. Rogers, Whiting, Ind., and Robert E. Wilson, Chicago, Ill., assignors to Standard Oil Co., Whiting, Ind. Filed Oct. 11, 1924. No. 1,615,407.

Fluid-Heater Control.—Foster Malic Poole, Tulsa, Okla., assignor to The Brown Instrument Co., Philadelphia, Pa. Filed July 6, 1925. No. 1,615,478.

Oil-Distillation Apparatus. — Foster Malic Poole, Tulsa, Okla., assignor to The Brown Instrument Co., Philadelphia, Pa. Filed July 6, 1925. No. 1,615,479.

Tube-Still Regulation.—Foster Malic Poole, Tulsa, Okla., assignor to The Brown Instrument Co., Philadelphia, Pa.

Process of Cracking or Treating Oils and Other Similar Hydrocarbons.—Homer T. Darlington, West Chester, Pa., and Ralph M. Steffen, Lincoln, Nebr., assignors to Martin B. Schuster, trustee, Joliet, Ill. Filed June 2, 1923. No. 1,614,660.

Oil Still.—John Primrose, Dongan Hills, N. Y., assignor to Power Specialty Co., New York, N. Y. Filed Apr. 7, 1921. No. 1,614,689.

Motor Fuel and Process of Making Same.—Lester Kirschbraun, Chicago, Ill. Filed Dec. 26, 1919. No. 1,614,735.

Conversion of Hydrocarbon Liquids.—Auguste Jean Paris, Jr. Bradford, Pa. Filed May 14, 1924. No. 1,614,930.

Method of Cracking Oil.—Frank E. Wellman, Kansas City, Kans., assignor to The Kansas City Gasoline Co., Kansas City, Kans. Filed July 10, 1922. No. 1,615,779.

Production

Rotary Drilling Bit.—Walter T. Woods, Long Beach, Calif., assignor to U. S. Tool Co., Long Beach, Calif. Filed July 12, 1926. No. 1,615,251.

Tool for Opening Collapsed Pipes or Casings.—David G. Lorraine, Los Angeles, Calif., assignor to Adrian R. Reynolds, Glendale, Calif. Filed Oct. 1, 1923. No. 1,615,306.

Undereamer for Well Drilling.—Edwin A. Hardison, Los Angeles, Calif., assignor to First Nat'l. Bank & Trust Co., Santa Paula, Calif. Filed Mar. 27, 1922. No. 1,615,379.

Pump.—John S. Ragar, Bowdoin, Mont. Filed July 29, 1926. No. 1,615,484.

Drilling Bit.—George B. Louderback, Compton, Calif. Filed Jan. 16, 1924. No. 1,615,547.

Rotary Well Drill.—John T. Phipps, Los Angeles, Calif. Filed Feb. 18, 1926. No. 1,615,596.

Derrick Safety Cage.—Mike Schwafel, Taft, Calif. Filed June 22, 1926. No. 1,615,657.

Pipe Perforator.—Arthur L. Fondren, Houston, Tex. Filed Sept. 12, 1925. No. 1,615,690.

Joint-Breaking Apparatus.—Joseph G. Grattan, Long Beach, Calif., assignor to Texas Iron Works Sales Corp., Houston, Tex. Filed Nov. 18, 1924. No. 1,615,695.

Back-Pressure Valve—Louis M. Pearce, Houston, Tex. Filed Nov. 5, 1923. No. 1,615,811.

Natural Gasoline

Method for Low-Temperature Cooling, Liquefaction, and Separation of Gases.—Arthur Seligman, Bremen, Germany. Filed Mar. 3, 1924. No. 1,615,597.

Process of Making Bituminous Emulsions.—Lester Kirschbraun, Chicago, Ill. Filed Nov. 21, 1919. No. 1,615,303.

ON THE LAZY BENCH

National Petroleum News

Extra! The "Spirit" Method of Locating Oil Wells Now Offered to Science

(*From literature sent to the Primrose Refining Co., Wichita Falls, Texas.*)

"Monday morning a clairvoyant told me, 'Mr. Lowe, you are going to get the surprise of your life.' Friday morning two invisible beings conversed over me before I got out of bed, talking about what they were going to do for me. After daylight there arose a Derrick about fifty feet high. In the twinkling of an eye a pipe was attached, running oil. The pump ran fast and quick and I could see the oil running. Then looking around I saw about fifty black spirits with white eyes in line about 20 feet above the ground.

"On the ground were about fifty yellow spirits who looked to be very intelligent people. Their noses were an inch longer than our noses, and their noses were round and extended over the upper lip. Then came about twenty-five pink-red spirits with red curly hair. They looked as if they would weigh about one hundred and eighty pounds. They were the best made men I have ever seen, with tapering arms and legs. One passed through my room with a new clay pipe in his mouth with the end turned down and nothing in it, and he was laughing. Then in passing through my room a voice said 'Now get you a company,' and the word company was written down as quick as lightning but nothing else was. Then commenced people coming in from this world. Then a few signs were given. And then came a large bird and lit on the corner of the house, and then signs were given me that I understood and the voice said, 'This is shallow.' This all seems to have been visions."

◈ ◈ ◈

Hercules Reborn

Vaudeville Agent (dubiously—"There are so many strong-man acts just now—do you fellows do anything out of the ordinary?"

Strong Man (impressively)—"We wind up our act by opening the drawers of an old-fashioned dresser."

—*Independent Topics*

◈ ◈ ◈

Aged Uncle—I've insured my life for five thousand dollars in your favor. What else can I do for you?

Nephew—Nothing on earth, uncle.

—*Barnsdall*

◈ ◈ ◈

"Go 'head, Ezry, it's your move."

"Durn it, wot's the rush. I haven't got rested from movin' that other checker yit."

—*Union Oil Bulletin*

Louie Hands the Geologists His Compliments

(*From the preface to Louis Fischer's "Oil Imperialism".*)

"It is quite as hazardous to estimate the underground oil reserves of a given patch of oleous territory as it is to guess the quantity of gin a child in swaddling clothes will swallow by the time it is old and rheumatic."

◈ ◈ ◈

Another Victory for The Gas Business

With a record of approximately 40,000,000 pies to his credit Richard Webb, of Toledo, Ohio, is said to be the champion pie baker of America. Webb, according to the American Gas Association, has been baking pies for 39 years and has averaged more than 3,000 pies a day during this period. The oven he uses for pie baking is a gas-fired, rotary brick oven, 20 feet in diameter, 8 feet high, with a concrete foundation 7 feet deep.

—*Ohio Gas and Oil Men's Journal*

◈ ◈ ◈

Reciprocity

Erickson—(Indian Refining Co.) "Where did we get those chairs we had at our last Service Station meeting?"

Dallas—"From an undertaker down on Fort St."

Erickson—"What did he charge us for them?"

Dallas—"He didn't charge anything—we promised to give him all our business!"

◈ ◈ ◈

No Evidence at All

"Witness," said a judge, "a dozen people say this man was drunk, but you claim he was sober."

"Of course he was sober," said the witness indignantly. "Why, judge, the only thing he did the least bit out of the way was to bring home a manhole cover and beat up his wife a little because she refused to play it on the phonograph."

—*Ohio Gas and Oil Men's Journal*

◈ ◈ ◈

Business is Business

"Don't you think doctor, you've rather overcharged for attending Jimmey when he had the measles?"

"You must remember, Mrs. Browne, that includes twenty-two visits."

"Yes, but you forget that he infected the whole school!"

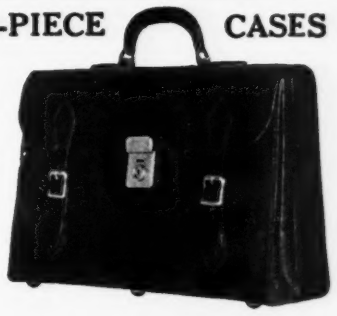
—*The Rig and Reel*

◈ ◈ ◈

We are all manufacturers—making good making trouble or making excuses.

—*Union Oil Bulletin*

2-PIECE CASES



303 Folio and inner Case, Only $16.50

Less 10% for cash

Made from heavy black cowhide with stiffened bottom, reinforced with metal studs. Extension lock and strong, comfortable handle. There are 3 roomy pockets for stationery and Inner Case, which has a handle and may be carried separately. It is velvet lined with compartment containing 9 four oz. bottles and 4 one half oz. jars. Your name embossed in gold *free*. Satisfaction guaranteed or your money returned.

Other Styles in our FREE Catalog

L-U-C-E

Builders of Sales Luggage

614 Delaware KANSAS CITY, MO.

The Hotel Baltimore in Kansas City

500 ROOMS—*RATES*

Room *without Bath*—$2.00 *and up*

Room *with Bath*—$2.50 *and up*

Double Room *with Bath*—$4.00 *and up*

Marble Coffee Shop

TABLE D'HOTE

Lunch 75c

Dinner . . . . . 85c & $1.25

also A la Carte Service

¶ THE SINCLAIR LAW OF 'LUBRICATION ¶ For every machine ¶ of every degree of wear ¶ there is a scientific Sinclair Oil ¶ to suit its speed and seal its power

SINCLAIR OILS
REG. U.S. PAT. OFF.

WAR on WASTE!

WITH the Law of Lubrication, Sinclair dealers make war on wasteful methods of lubrication which lessen the power and lower the value of automobile engines.

Introduce in your community this common-sense method of recommending the right grade of Sinclair Opaline Motor Oil—a simple and valued method which means more gallonage for you because it makes more satisfied car owners. *Why sell just "oil"?* Why not sell correct lubrication for economical transportation, scientifically based on the wear of the engine at its present mileage condition?

SINCLAIR REFINING COMPANY
45 Nassau Street, New York
Atlanta Detroit Kansas City Chicago Houston Omaha

SINCLAIR
OPALINE
REG. U.S. PAT. OFF.
MOTOR OIL

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Refinery - Tank Wagon Markets

National Petroleum News

Gasoline Prices are Leveling; Kerosenes And Naturals Gain Strength

Staff Special
TULSA, Feb. 5

A GENERAL revision in gasoline quotations marked the close of the week in the Mid-Continent markets. Several refiners who had been working off some excess stocks earlier in the week had obtained sufficient relief to advance prices slightly, while other refiners who had been quoting as much as half a cent above the market had reduced their prices until they were more nearly in line with the majority of spot sales.

What effect this readjustment in the price scale will have is problematical. It had not been in force long enough before the close of business today to establish a definite trend, but indications were that it would result in a leveling out of prices in the Mid-Continent.

Most of the sales for relief were on U. S. Motor. Prices ranged from 8½ cents per gallon up. A considerable amount of this material was moved east of the Mississippi river in competition with material from other areas quoted on an f. o. b Group 3 basis but at somewhat lower prices than prevailed generally in the middle and northwestern portions of the marketing territory.

As various refiners this week worked off excess stocks they advanced their prices from an eighth to a quarter of a cent, 8¾ cents being in most cases the new minimum. This process of stock reduction appeared to be just about over today, and it was generally predicted prices would be slightly nearer 8¾ to 9 cents for the first of next week at least.

THERE undoubtedly has been some buying of U. S. Motor at 8½ cents for storage, but one renfier who unloaded a quantity of this material late this week said he doubted if any large quantities had been bought for this purpose. When a jobber buys for storage, he said, the purchase is usually for 20 or more cars. He found his orders in only rare instances were for that quantity of gasoline, and were in practically every instance for immediate shipment.

An Arkansas refiner yesterday booked an order for fifty cars of U. S. Motor for export movement. The price was not revealed. This refiner said that the order placed him in good shape for the next two weeks or more. Reports were received here today that inquiries were out for some export U. S. Motor in Texas, but the trade generally placed little faith in the report, primarilly because Texas refiners are still working on higher gravity gasoline orders and U. S. Motor is relatively scarce in that field. One refiner at Wichita Falls has been getting 9¼ cents for what U. S. Motor he has been selling. His sales have not been large at that price, but marketers in that area report they have been unable to get any material at less than 9 cents and that the trade generally was resisting any effort to get the price above 9 cents.

EXPORT buying on high gravity gasolines has been dormant again this week. One cause for this seeming lack of interest, one close student of the market said, was because of the high charter rates at present and the inability of export companies to get tankers.

High gravity gasolines of export specifications meanwhile are beginning to accumulate in north Texas and in Oklahoma. One export company representative said a few refiners have intimated to him that they would be interested in moving 10 or 15 cars of material at a concession in order to keep from storing the material at present. The domestic business on high tests has not been as brisk as they would like to see it, and they have been reluctant to offer the surplus on the domestic market. Offers of odd car lots of 64-66, 375 e. p. gasoline as low as 10 cents from north Texas refiners were heard, but exporters apparently were reluctant to buy just at present even at that price.

Although there is considerably more high gravity gasoline available in Texas than has been the case for some time, there apparently is no tendency on the part of the refiners in that area to switch their runs back to U. S. Motor as was the case this summer when export buying was practically at a standstill.

Natural gasolines continued to regain some of the ground lost during January. This was especially true of the lower grades. Buying of Grade C for eastern and southern movement has been sufficient within the past 10 days to take care of all the distress material in the field and prices were strong today at 6¼ cents. Grade BB has been firm for the past three or four days at 6½ cents.

WHEN the market on naturals was falling rapidly Grade AA was the slowest to go down. Since the market turned and started upward Grade AA has been the slowest to respond. One large refiner who has considerable natural gasoline production, however, stored his Grade AA when the market was weak and instructions scarce. He was offering that material today at 7¼ cents per gallon.

The low prices on naturals have brought many jobbers into the market within the past few days. As long as the price is under U. S. Motor sufficiently for the jobbers to get naturals into their bulk stations at even a fraction under U. S. Motor they can blend the two, save a little money and get a quicker starting motor fuel. That apparently is what they have been doing recently.

The increased activity in kerosenes which was first noted about the middle of January gained more momentum this week. After being pegged at 6 cents per gallon all week, 41-43 w. w. grade today moved up to 6 to 6¼ cents with several sales at the higher figure and several refusals by refiners to sell at that price. One large refinery sales executive said Thursday that he had sold more kerosene that day and the day previous than all three of the company's branch offices sold during January. His sales were all at 6 cents, he said. Another refinery salesman said within the past three days he has sold over 40 cars of kerosene. Still another refinery executive said today that at present his plant is over 20 cars behind on kerosene shipments.

A good part of this kerosene buying has been carried on by jobbers who are evidently preparing for the spring demand. Considerable material has been bought also for speculation by marketers who are anticipating an early spring.

Distillates are presenting a problem at present. Prices on 38-40 straw distillate have gone under 5 cents in Okla-

(Continued on page 117)

Model CK Autocar owned by The American Oil Co., Baltimore, Md. They now operate 5 Autocars.

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Autocar Trucks of conventional design

The Autocar truck, with the engine out in front, is changed in appearance only. It is the same Autocar truck whose economy and dependability have already been demonstrated in hundreds of lines of business.

There has been no scrapping of "engine-under-the-seat models," for The Autocar Company recognizes that many users insist upon the distinctive advantage of short wheelbase handiness and the resultant ease of handling in present day traffic.

The new models are simply additions, not replacements. They have the same 4-cylinder engine, the same transmission, the same rear axle, and are sold at the same price schedule as our trucks with the engine under the seat. They are built in the same Factory and sold and serviced in the same Branches.

The Autocar Company
ESTABLISHED 1897
Ardmore, Pa.

Autocar Trucks

Tank Wagon, Service Station Markets for Gasoline and Kerosene In United States Territories and Canada

These Prices in Effect Feb. 7, 1927

S. O. NEW JERSEY TERRITORY

	Gasoline				Oil
	T.W.	Tax	Total T.W.	S.S.	T.W.
Atlantic City, N. J.	19	0	19	*	15
Newark, N. J.	19	0	19	21	15
Annapolis, Md.	18	2	20	*	15
Baltimore, Md.	18	2	20	23	10
Cumberland, Md.	18	2	20	23	15
Washington, D. C.	18	2	20	23	13
Danville, Va.	18	4½	22.5	*	15
Norfolk, Va.	18	4½	22.5	25.5	15
Richmond, Va.	18	4½	22.5	25.5	15
Roanoke, Va.	18	4½	22.5	25.5	15
Petersburg, Va.	18	4½	22.5	25.5	15
Williamsburg, Va.	18	4½	22.5	*	15
Charleston, W. Va.	18	3½	21.5	24.5	15
Clarksburg, W. Va.	18	3½	21.5	24.5	15
Keyser, W. Va.	18	3½	21.5	*	15
Parkersburg, W. Va.	18	3½	21.5	24.5	15
Wheeling, W. Va.	18	3½	21.5	24.5	15
Charlotte, N. C.	19	4	23	26	15
Hickory, N. C.	19	4	23	*	15
High Point, N. C.	19	4	23	*	15
Mt. Airy, N. C.	19	4	23	26	15
Salisbury, N. C.	19	4	23	26	15
Charleston, S. C.	19	5	24	27	15
Columbia, S. C.	19	5	24	27	15

*Dealers set own prices. S. O. New Jersey does not operate station.

S. O. NEW YORK

Due to local price conditions at many points in S. O. New York territory, actual prices on both gasoline and kerosene are being made at under the posted tank wagon prices published below.

*New York City	21	0	21	25	17
Albany, N. Y.	21	0	21	23	17
Buffalo, N. Y.	19	0	19	22	14
†Rochester, N. Y.	19	0	19	23	14
Syracuse, N. Y.	21	0	21	23	17
Boston, Mass.	21	0	21	23	15
Augusta, Me.	21	3	24	27	17
Manchester, N. H.	21	2	23	25	17
Burlington, Vt.	21	2	23	25	17

*In steel barrels.

†It is reported that S. O. New York is selling a second grade of gasoline at Rochester, 2c below the above posted prices which apply on its Socony grade

ATLANTIC REFINING

Pittsburgh, Pa.	19	*	19	*24	16
Philadelphia, Pa.	19	*	19	*24	16
Allentown, Pa.	19	*	19	*24	16
Erie, Pa.	19	*	19	*24	16
Scranton, Pa.	19	*	19	*24	16
Altoona, Pa.	19	*	19	*24	16
Dover, Del.	19	2	21	24	16
Wilmington, Del.	19	2	21	24	16
Providence, R. I.	21	1	22	24	18
Boston, Mass.	21	0	21	23	15
Springfield, Mass.	21	0	21	23	18
Worcester, Mass.	21	0	21	23	18
Hartford, Conn.	21	2	23	25	17
New Haven, Conn.	21	2	23	25	17

*2-cent state tax is collected by retail dealer and paid by him directly to state.

S. O. KENTUCKY

Lexington, Ky.	18	5	23	26	17
Louisville, Ky.	17	5	22	25	17
Covington, Ky.	18	5	23	26	17
Clarksdale, Miss.	16	4	20	23	14.5
Gulfport, Miss.	††17.5	4	††21.5	24.5	15
Jackson, Miss.	16	4	20	23	15.5
Natchez, Miss.	15.5	4	19.5	22.5	15
Vicksburg, Miss.	15.5	4	19.5	22.5	15
Birmingham, Ala.	18	4	22	25	17.5
Mobile, Ala.	17	4	21	24	16
Montgomery, Ala.	*19	4	23	26	*18.5
Atlanta, Ga.	†18	3½	22	25	18
Augusta, Ga.	†18	3½	22	25	17
Macon, Ga.	†18	3½	22	25	18
Savannah, Ga.	†18	3½	22	24	16
Jacksonville, Fla.	16	4	20	23	16
Miami, Fla.	18	4	22	25	17.5
Tampa, Fla.	16	4	20	23	16
Pensacola	**17	4	**21	24	16.5

*Local privilege tax of 1 cent on gasoline and ½ cent on kerosene at Montgomery included.

†Georgia has ½ cent per gal. inspection fee on gasoline which is deducted as well as the state gasoline road tax of 3½ cents, to get the actual net tank wagon market to dealer.

**Both tank wagon prices include 1c city tax at Pensacola, which went into effect Oct. 15, 1926.

††Both tank wagon prices at Gulfport include Harrison county privilege tax of 2c.

S. O. INDIANA

	Gasoline				Oil
	T.W.	Tax	**Total T.W.	S.S.	T.W.
Chicago, Ill.	17	0	17	19	13
Decatur, Ill.	17.2	0	17.2	19.2	13.6
E. St. Louis, Ill.	16.1	0	16.1	18.35	12.7
Joliet, Ill.	17.4	0	17.4	19.4	13.8
Peoria, Ill.	17.2	0	17.2	19.2	13.6
Quincy, Ill.	17.2	0	17.2	19.2	13.4
Indianapolis, Ind.	17.2	3	20.2	22.2	14.2
Evansville, Ind.	17	3	20	22	1
South Bend, Ind.	17.4	3	20.4	22.4	14.4
Detroit, Mich.	17.8	2	19.8	21.8	14.7
Grand Rapids, Mich.	17.7	2	19.7	21.7	14.6
Saginaw, Mich.	17.9	2	19.9	21.9	14.8
Green Bay, Wis.	17.6	2	19.6	21.6	13.4
Madison, Wis.	17.3	2	19.3	21.3	13.1
Milwaukee, Wis.	17.1	2	19.1	21.1	12.9
La Crosse, Wis.	18.2	2	20.2	22.2	14
Minneapolis, Minn.	15.2	2	17.2	19.2	13.9
Duluth, Minn.	18.5	2	20.5	22.5	13.9
Mankato, Minn.	18.1	2	20.1	22.1	13.7
Des Moines, Iowa.	16	2	18	20	13.5
Davenport, Iowa.	17.5	2	19.5	21.5	13.5
Sioux City, Iowa.	12.9	2	14.9	16.9	13.1
Mason City, Ia.	17.5	2	19.5	21.5	13.5
St. Louis, Mo.	*16.6	2	18.6	20.9	12.6
Kansas City, Mo.	†16	2	18	20	11.9
St. Joseph, Mo.	†17.5	2	19.5	21.5	12.5
Fargo, N. D.	19.9	2	21.9	23.9	15.9
Grand Forks, N. D.	20	2	22	24	16.2
Minot, N. D.	19.9	2	21.9	23.9	15.9
Pierre, S. D.	18.5	3	21.5	23.5	14.9
Huron, S. D.	18.5	3	21.5	23.5	14.9
Wichita, Kans.	15.8	2	17.8	19.8	11.8
Bartlesville, Okla.	15.8	3	18.8	20.8	11.8

**Dumps of 50 gallons or more, 1c discount through territory, except in Chicago where 1c discount applies on dumps of 100 gallons or more.

*Includes city tax of ½c.

†Includes city tax of 1c.

S. O. NEBRASKA

Omaha, Neb.	14.25	2	16.25	20.25	13.25
McCook	18.75	2	20.75	22.75	14.75
Norfolk	16	2	18	20	13.75
North Platte	18.75	2	20.75	22.75	14.5
Scottsbluff	18.25	2	20.25	22.25	14

CONTINENTAL OIL

Denver, Colo.	18	2	20	21	15.5
Pueblo, Colo.	15	2	17	19	15.5
Grand Junction, Colo.	21.5	2	23.5	25.5	19
Casper, Wyo.	18	2½	20.5	22.5	14
Cheyenne, Wyo.	19	2½	21.5	23.5	15.5
Butte, Mont.	19	3	22	22	19
Helena, Mont.	22	3	25	27	19
Salt Lake City, Utah.	20.5	3½	24	26	17
Boise, Ida.	22.5	3	25.5	27.5	19
Twin Falls, Ida.	22.5	3	25.5	27.5	19
Albuquerque, N. M.	20	3	23	26	18

S. O. CALIFORNIA

Phoenix, Ariz.	19	3	22	25	21.5
Los Angeles, Cal.	13.5	2	15.5	18.5	15.5
Fresno, Cal.	14	2	16	19	16.5
San Francisco, Cal.	14	2	16	19	15.5
Reno, Nev.	18	4	22	25	19
Portland, Ore.	14	3	17	20	16.5
Seattle, Wash.	14	2	16	19	16.5
Spokane, Wash.	18	2	20	23	20.5
Tacoma, Wash.	14	2	16	19	16.5

S. O. LOUISIANA

Little Rock, Ark.	15	4	19	22	13
Alexandria, La.	15	2	17	20	†15
Baton Rouge, La.	14	2	16	19	†13.5
Lake Charles, La.	15.5	2	17.5	20.5	†15
New Orleans, La.	*15.5	2	17.5	20.5	†15
Shreveport, La.	14	2	16	19	†14
Lafayette, La.	15	2	17	20	†14.5
Bristol, Tenn.	17.5	3	20.5	23.5	15.5
Chattanooga, Tenn.	17.5	3	20.5	23.5	13.5
Knoxville, Tenn.	17.5	3	20.5	23.5	16
Nashville, Tenn.	16	3	19	22	16
Memphis, Tenn.	15	3	18	21	15

*Includes 1c parish tax on gasoline.

†Kerosene prices in Louisiana include 1c state tax.

S. O. OHIO

	Gasoline				Oil
	T.W.	Tax	Total T.W.	S.S.	T.W.
All Ohio points	19	2	21	23	17

MAGNOLIA PETROLEUM

Muskogee, Okla.	15	3	18	21	11
Oklahoma City	15	3	18	21	13
Tulsa, Okla.	15	3	18	21	13
Fort Smith, Ark.	15	4	19	22	13
Little Rock, Ark.	15	4	19	22	13
Texarkana, Ark.	†19	4	†*23	†*23	15
Dallas, Tex.	†16	1	†17	†17	15
Fort Worth, Tex.	††14	1	††15	††15	13
Houston, Tex.	†17	1	†18	†18	15
San Antonio, Tex.	†16	1	†17	†17	14
El Paso, Tex.	**18	1	**19	**19	16

*Within city of Texarkana, Ark., the state tax on gasoline is 1c per gal. conforming with the Texas state tax. In Texarkana district outside of the city the 4c state tax applies.

†3c per gal. discount to dealers.

**2c per gal. discount to dealers at El Paso.

††1c per gal. discount to dealers at Fort Worth.

V. M. & P. NAPHTHA

(Changes ordinarily occur coincident with gasoline price changes)

	Oleum Spirits	V.M. & P. Naphtha	Cleaner Naphtha
Chicago	18	20	20
Detroit	19.7	21.7	21.7
Kansas City	18.2	20.2	20.2
Milwaukee	18.7	*22.7	*22.7
Minneapolis	*22	*24	*24
St. Louis	17.9	19.9	19.9
New York	..	21	....

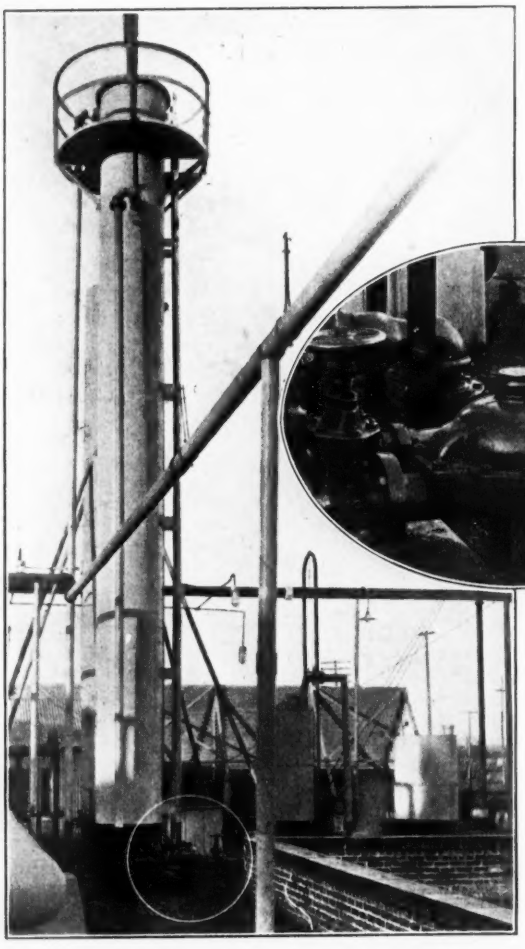
*Includes 2c state tax.

CANADA

(Per Imperial Gallon, which is 1.2 American Gallons)

	Gasoline				Oil
	T.W.	Tax	Total T.W.	S.S.	T.W.
ONTARIO					
Toronto	24.5	3	27.5	31	24
Ottawa	24.5	3	27.5	31	24
Cochrane	31.5	3	34.5	40	29
Ft. William	25.5	3	28.5	32	26.5
MANITOBA					
Winnipeg	27.5	3	30.5	34	26.5
SASKATCHEWAN					
Regina	30.5	0	30.5	35	29.5
ALBERTA					
Edmonton	29.5	2	31.5	35	28.5
Calgary	27.5	2	29.5	33	26.5
BRITISH COLUMBIA					
Vancouver	22	3	25	29	23
QUEBEC					
Montreal	24.5	3	27.5	31	24
Quebec City	26.5	3	29.5	33	26
Three Rivers	26.5	3	29.5	33	26
NEW BRUNSWICK					
St. John	27.5	3	30.5	35	27
Moncton	27.5	3	30.5	35	27
NOVA SCOTIA					
Halifax	27.5	3	30.5	35	27
Sydney	29.5	3	32.5	37	29
PRINCE EDWARD ISLAND					
Charlottetown	27.5	3	30.5	34	27

Note: In districts surrounding these points 1c additional is added to city price.



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Refinery Markets on Wax and Heavy Oil Products

Pennsylvania, Oklahoma, Kansas, North and South Texas, Louisiana, Arkansas, California, and New England

WAX

*PENNSYLVANIA	Prices Feb. 7	Prices Jan. 31	Prices Jan. 24
122-124 White Crude Scale.	4½- 4⅝	4⅝- 4¾	4⅝- 4¾
124-126 White Crude Scale.	- 4⅝	- 4¾	- 4¾
OKLAHOMA			
124-126 White Crude Scale.	- 4¾	- 4¾	- 4¾
CALIFORNIA			
White Crude Scale.....	6 - 7	6 - 7	6 - 7

*Per Pound, New York

FUEL OIL

PENNSYLVANIA			
36-40 Fuel Oil.....	6¼- 6½	6¼- 6½	6¼- 6¼
30-34 Fuel Oil.....	6 - 6¼	6¼- 6½	6¼- 6½
28-30 Fuel Oil.....	6 - 6⅛	6 - 6¼	6 - 6¼
OKLAHOMA			
38-40 Straw distillate.....	4⅞- 5	5 - 5¼	5 - 5¼
36-38 Straw distillate.....	4⅝- 4¾	4¾- 5	4⅞- 5
32-36 Gas oil cracked (Gal.)	4⅜- 4⅝	4⅜- 4⅝	4⅜- 4½
32-36 uncrackedGas oil, (Gal.)	4¼- 4½	4¼- 4½	4¼- 4½
†28-30 Fuel oil (Bbl.).....	1.50 -1.60	1.50 -1.60	1.50 -1.60
†26-28 Fuel oil (Bbl.).....	1.30 -1.40	1.30 -1.40	1.30 -1.40
24-26 Fuel oil (Bbl.).....	1.25 -1.30	1.25 -1.30	1.25 -1.30
22-26 Fuel oil (Bbl.).....	1.20 -1.25	1.20 -1.25	1.20 -1.25
18-22 Fuel oil (Bbl.).....	1.17½-1.20	1.17½-1.20	1.17½-1.20
16-18 Fuel oil (Bbl.).....	1.17½-1.20	1.17½-1.20	1.17½-1.20
14-16 Fuel oil (Bbl.).....	1.15 -1.17½	1.15 -1.17½	1.15 -1.17½

†Zero cold test material bringing from 5 to 15 cents more per barrel.

KANSAS*			
38-40 straw distillate.....	- 5½	5½- 5¾	5½- 5¾
36-38 straw distillate.....	- 5¼	5¼- 5½	5¼- 5½
32-36 Gas Oil.....	4⅜- 4½	- 4½	- 4½
18-22 Fuel Oil.....	1.25 -1.35	1.25 -1.35	1.25 -1.35
24-26 Fuel Oil.....	1.45 -1.55	1.45 -1.55	1.45 -1.55

*F. O. B. refinery, Kansas destination.

NORTH TEXAS			
38-40 Straw distillate.....	4¾- 5	4¾- 5	4¾- 5
32-36 Gas Oil (Gal.)cracked	- 4¼	4⅛- 4¼	4 - 4¼
32-36 uncracked gas oil....	4⅛- 4¼	4 - 4¼	4 - 4¼
24-26 Fuel per (Bbl.).....	1.55 -1.60	1.52½-1.55	1.52½-1.55
GULF COASTAL			
Fuel.....	1.60 -1.65	1.55 -1.60	1.55 -1.60
Gas Oil.....	5¼- 5⅜	5¼- 5⅜	5¼- 5¼

NORTH LOUISIANA	Prices Feb. 7	Prices Jan. 31	Prices Jan. 24
32-36 Gas oil,cracked (Gal.)..	- 4½	- 4½	- 4¾
32-36 Gas oil,uncracked (Gal.)	4⅛- 4⅛	4½- 4¾	4¾- 5
16-20 Fuel Oil (Bbl.).....	-1.30	-1.30	1.25 -1.30
ARKANSAS			
30-34 Gas oil.....	4¼- 4⅝	4½- 4⅝	4½- 4⅝
32-36 Gas oil.....	- 4¾	- 4¾	- 4¾
Smackover Crude Fuel....	1.25 -1.30	1.25 -1.30	1.25 -1.27½
CALIFORNIA*			
14-18 Fuel Oil (Bbl.).....	.80 -1.00	.80 -1.00	.80 -1.00
14-18 Bunker Oil (Bbl.)....	.80 -1.00	.80 -1.00	.80 -1.00
30-34 Gas Oil (Bbl.).....	1.30 -1.35	1.30 -1.35	1.30 -1.35
27 + Diesel Oil (Bbl.)....	-1.15	-1.15	1.15 -1.30

*(San Joaquin Valley, San Francisco 4c per bbl. more.)

NEW ENGLAND (F. O. B. Boston and Fall River)			
30-32 Gas Oil (Gal.).....	- 6¼	- 6¼	- 6¼
Fuel Oil (Bunker C) Bbl...	-1.98	-1.97	-1.90

PETROLATUMS

PENNSYLVANIA (Cents Per Pound in Tank Cars)*

Snow White.....	7¼- 7½	7¼- 7½	7¼- 7½
Lily White.....	- 6¼	- 6¼	- 6¼
Cream White.....	- 6¼	- 5¼	- 5¼
Light Amber.....	2⅝- 2¾	2⅝- 2¾	2⅝- 2¾
Amber.....	2⅜- 2½	2⅜- 2½	2⅜- 2½
Red.....	- 2⅛	- 2⅛	- 2⅛
Green No. 5 Color.....	- 1½	- 1½	- 1½

*In barrels ¾c a pound more, carlots.

PETROLEUM COKE

OKLAHOMA (Per ton in car lots)

Lump.....	35-36	35-36	35-36
Breeze.....	2-2.25	2-2.25	2-2.25
Still Run.....	3.25-3.50	3.25-3.50	3.25-3.50

Above prices are f. o. b. refinery in tank car. They are the prices at which the bulk of the products on the open market move. Whoever has knowledge of any open market prices on any considerable quantity of goods differing from the foregoing. will favor us with this information.

(Continued from page 113)

homa and refiners report movement has been slow. Several who have discussed this situation attribute the lower prices at this time of the year to the wider use of zero gas oil for home heating purposes.

Gas oils meanwhile have remained unchanged throughout the week with movement steady. North Texas refiners who a week or 10 days ago had a surplus of gas oil have gotten their stocks worked down sufficiently now to put their prices up slightly. Gas oil in Kansas on the other hand moved an eighth of a cent lower this week. In Arkansas and Louisiana both demand and movement have been fair.

Refiners in this area are closely following the coal situation at present. If a strike should develop within the next 30 to 90 days they believe a better fuel oil market will be experienced. Roger W. Babson is quoted as having advised coal users to lay in a supply in anticipation of a possible strike.

In the meantime fuel oil movement has been steady this week. One buyer said today that it has been his experience this week that where he found fuel oil for sale the refiners didn't have the cars to make shipment, and where he found the cars the refiners didn't have the fuel.

Atlantic Coast Gasoline Firm As T. W. Prices Rise

By Special Correspondent

NEW YORK, Feb. 7

REGARDLESS of unsettled condition of the Mid-Continent gasoline markets, the Atlantic Coast gasoline markets were firmly maintained last week. Leading marketers have been revising tank wagon prices upward and the upstate market appears healthier than it has been in several months. Advances in Pennsylvania and Delaware gasoline tank wagon prices Jan. 31 further tended to strengthen the market.

Bulk gasoline is firmly held all along the Seaboard. U. S. Motor in tank cars at the refineries and terminals was generally held at 12¼ cents a gallon and 13¼ cents delivered to the trade. With bulk U. S. Motor held at 8½ to 9 cents a gallon on the Pacific coast, and tanker rates high, it was impossible to lay it down here below 11½ to 12 cents a gallon, in cargo lots.

Marketers of California gasoline reported a good jobbing demand, in fact all of the refiners stated that there was a marked improvement in buying last week and U. S. Motor in tank cars delivered to the trade was firmly held at 12¼ to 12½ cents a gallon. Distributors are buying for spring and better weather last week noticeably increased consumption.

Kerosene

Bulk kerosene was steady in the Atlantic Seaboard markets last week. Buying has become spasmodic but consumption is holding up fairly well. Farmers are beginning to buy kerosene. Water white, 41-43, in tank cars at Atlantic Seaboard refineries is 9 cents a gallon and 41-43 prime white is quoted at 9 cents f. o. b. and 10 cents delivered. The asking price for 43-45 water white is 9¼ to 9½ cents at refineries and 10¼ to 10½ cents delivered.

Gulf refiners reported a better demand for 41-43 water white at 7½ cents in tank cars at refineries. Stocks on hand have been moderate and are not burdensome now.

Market Section

Kerosene and U. S. Motor Gasoline Active in Chicago Market

CHICAGO, Feb. 5

KEROSENE activity this week featured the Chicago resale market. Increased jobbing demand which began Wednesday, continued to the close of business today. The price became firmer at 6 cents with some sellers quoting 6¼ cents during the last half of the week.

One refiner today reported those of his jobbers that had storage space, were buying. Another refiner, who buys kerosene, reported prices in the field were strengthening rapidly on Thursday. The 41-43 water white kerosene price was 6 cents early in the week. Several refiners and carload marketers advanced their quotations to 6¼ cents Thursday and reported some sales at that figure.

U. S. Motor gasoline also was more active. The market remained at 8¾ to 9 cents. Two refiners who had been quoting 9½ cents through January, reduced their price Friday to 9 cents and two refiners who had an 8¾-cent market reported sales at 9 cents but still were meeting competition at lower prices.

High test gasolines had a quiet week. Prices were fractionally lower Saturday. The 68-70, 350-360 end point grade ranged from 11⅛ to 11½ cents Monday and eased off fractionally to 11 to 11¼ cent market beginning Thursday. The 64-66, 375 e.p. gasoline began the week at 10½ to 10¾ cents, went to 10½ cents Tuesday and to 10⅜ to 10½ cents Thursday; the 60-62, 400 e.p. grade went down to 9¾ cents flat Thursday after having had a range of 9¾ to 10 cents. One refiner reported a good volume of business at prices fractionally higher than the market. The 60-62, 437 e.p. gasoline was firm at 9 cents.

While fuels were generally quiet there were a few reports of activity in the spot market and also on contracts. In some quarters there is talk that fuels may be in for a play if coal miners strike. Other sellers place no credulence in reports of an impending tie-up at the mines. One marketer reported he was having more difficulty to obtain fuels in the field; on the other hand a refiner selling a low gravity fuel was getting a good price for his fuel and was keeping production well sold up.

Fuel prices were steady over the week. Low cold test 28-30 fuel brought from $1.60 to $1.65, and the 24-26 grade was $1.25 to $1.30. The 22-26 fuel was $1.20 to $1.25 early in the week but was firmer at $1.25 at the end. The 18-22 fuel was pegged at $1.17½ to $1.20 with some sales at $1.22½. Smackover was $1.25 to $1.27½.

Furnace oils also were quiet. The 38-40 straw of low flash was 5 to 5¼ cents. Some sales were made up to 5½ cents but 5 cents was the predominating price. Gas oil of 32-36 gravity straw with zero cold test was 4¾ cents; the dark zero remained at 4½ to 4⅝ cents early in the week then settled to 4⅜ to 4⅝ cents and the dark higher cold test which sold for 4⅜ to 4½ cents until Wednesday, closed the week at 4¼ to 4⅜ cents. The trade reported jobber's stocks were fairly large and some jobbers were buying on the open market this month instead of contracting for their needs.

Warmer weather prevailed this week, with a few clear days, in this marketing territory excepting in the northern border states. Moderate temperatures for the season are predicted for next week with probably occasional periods of precipitation.

Benzol is Firmer

NEW YORK, Feb. 7.—Reflecting the upward swing in gasoline tank wagon prices, motor benzol was slightly firmer last week. Leading marketers are still quoting spot motor benzol in tank cars at the ovens at 23 cents a gallon. Production is slightly lighter. There has been an improvement in demand for benzol contracts. The present movement is mainly on contract and is fully up to expectations. There has been a good inquiry from the large benzol exporters and several bulk shipments have been reported to the United Kingdom during the last 10 days.

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Week's Price Changes Tank Wagon Markets

Gasoline Changes

Standard of Kentucky—T.w and s.s. prices gasoline advanced 2 cents, Georgia and Florida, **Feb. 7.**

Correction: T.w. prices of gasoline at Mobile in Feb. 2 issue of National Petroleum News were published as 16 cents without tax, and 20 cents with 4 cent tax. Prices should have been 17 cents and 21 cents without and with tax respectively, since Jan. 13.

Magnolia Petroleum—T.W. and Service Station prices of gasoline reduced 1 cent, Houston, to 18 cents, **Feb. 4.**

More Neutrals Available in Pennsylvania

CLEVELAND, Feb. 5.—A few cars of Pennsylvania viscous neutrals for immediate shipment were on the market today but the spot supply is still scarce. Refiners report they are caring for the neutrals requirements of regular customers.

Inquiries for cylinder stocks are more numerous than a week ago. Prices for stocks have been adjusted by some refiners but on the whole are being well maintained.

Demand for non viscous neutrals has been larger in the last few weeks than for several months. Several refiners are cracking these oils and some shopping is required to locate goods that meet higher flash and light color specifications.

Gasoline movement is steady. Buying on the open market is rather light and some shading has been done by refiners who have no established outlets either through their own distributing stations or through stations of regular customers. On the other hand, refiners who strive to make gasoline slightly higher than the usual specifications for the various grades, are getting prices higher than the general market.

Kerosene is a little stronger today but some weak spots have been evident. The 45 water white price runs 8 to 8¼ cents but some for resale was offered brokers last week as low as 7¾ cents. This kerosene seems to have disappeared by today.

Fuel oil is moving fairly well. The 36-40 straw and cherry red grades are going at 6¼ to 6½ cents, low cold test oil commanding the higher price.

Bright stocks seem to have shaken off a tendency toward softness. Long residuum stocks are reported as firm. Wax is soft, although the movement is fairly steady.

Refinery Markets on Light Oils and Lubricants

Pennsylvania, Oklahoma, Kansas, North and South Texas, Louisiana, Arkansas, California and New England

GASOLINE AND NAPHTHA

PENNSYLVANIA	Prices Feb. 7	Prices Jan. 31	Prices Jan. 24
52-54 Naphtha	11½–12	11¼–11¾	11¼–11¾
54-56 Naphtha	11¾–12¼	11¾–12	11½–12
58-60 Gasoline	11¾–12	–12	11½–12
60-62 Straight-run gasoline	12½–13	12½–13	12½–13
64-66 Straight-run gasoline	13¼–13¾	13½–14	13½–14
68-70 Straight-run gas. 350-360 E.P.	13¾–14¼	14 –14½	14½–15
68-70 Straight-run gas. 305-320 E.P.	18 –20	18 –20	18 –20
OKLAHOMA			
48-50 450 E. P. naphtha	– 8¾	9 – 9⅛	9 – 9⅛
50-52 450 E. P. naphtha	– 8¾	9 – 9⅛	9 – 9⅛
56-58 450 E. P. gasoline	– 8½	8½– 8¾	8⅞– 8¾
56-58 U. S. Motor gasoline	8½– 8⅝	– 8¾	8¾– 9
58-60 450 E. P. gasoline	8½– 8⅝	8⅝– 8¾	– 8¾
58-60 U. S. Motor 437 E. P.	8⅝– 9	8¾– 9	9 – 9¼
60-62 437 E. P. gasoline	– 9	9 – 9½	9¼– 9½
60-62 400 E. P. gasoline	9⅜– 9½	9⅝– 9¾	9¾–10
64-66 390 E. P. gasoline	–10	10 –10⅛	–10¼
64-66 375 E. P. gasoline	10¼–10½	10⅜–10⅝	10½–10¾
68-70 350-360 E. P. gasoline	–11	11 –11¼	–11¼
KANSAS*			
58-60 U. S. Motor gasoline	9 – 9¼	9 – 9¼	9¼– 9½
60-62, 400 E. P. gasoline	–10	–10	–10¼
64-66 375 E. P. gasoline	–10¾	–10¾	–10¾
*F. O. B. refinery Kansas destination.			
NORTH TEXAS			
48-50 450 E. P. naphtha	– 8½	8½– 8¾	– 8¾
56-58 450 E. P. gasoline	8⅜– 8½	8½– 8⅝	– 8⅝
58-60 450 E. P. gasoline	– 8⅝	8⅝– 8¾	– 8¾
56-58 U. S. Motor gasoline	– 8¾	– 8¾	8¾– 8⅞
58-60 U. S. Motor gasoline	– 9	– 9	– 9
64-66 390 E. P. gasoline	–10	10 –10⅛	–10¼
64-66 375 E. P. gasoline	–10¾	10¼–10½	10½–10¾
68-70 350-360 E. P. gasoline	–10¾	–11	–11¼
NORTH LOUISIANA			
58-60 U. S. Motor 437 E. P.	– 9	9 – 9⅛	9 – 9¼
ARKANSAS			
56-58 450 E. P. gasoline	8½– 8¾	8½– 8¾	– 8¾
58-60 450 E. P. gasoline	– 8¾	– 8¾	– 8⅞
58-60 U. S. Motor gasoline	– 9	8¾– 9	9 – 9¼
CALIFORNIA			
*54-58 U. S. Motor 437 E. P.	9½–10	9½–10	9½–10
*58-61 U. S. Motor, 437 E. P.	10¼–11	10½–11	10½–11
*42-45 Engine distillate 445-480 E. P.	7 – 7½	7 – 7½	7 – 7½
*2c tax to be added if used in state.			
NEW ENGLAND (F. O. B. Boston and Fall River)			
58-60 U. S. Motor gasoline	–13	–12¾	–12¾

NATURAL GASOLINE

(Note: End point of all grades, not over 375° F.)

OKLAHOMA			
Grade AA, 80-87.9 375 E. P.	7¼– 7½	– 7¼	– 7¾
Grade A, 72-79.9 375 E. P.	7¾– 8	– 7½	– 7¾
Grade BB, 84-92, 375 E. P.	6⅜– 6½	– 6¼	6½– 6¾
Grade B, 76-83.9, 375 E. P.	– 6¾	– 6½	6½– 6¾
Grade C, 80-90, 375 E. P.	*6¼	6 – 6⅜	6 – 6¼
NORTH LOUISIANA			
*Grade Double A	7¾– 8	– 7¾	– 9
*Grade Double B	6¾– 7	– 6¾	– 8
*Grade C	6½– 6¾	– 6½	– 7¼
*F. O. B. Monroe District.			
NORTH TEXAS			
*Grade Double A	7¼– 7½	– 7¼	– 7¾
*Grade A	– 7¾	– 7½	– 7¾
*Grade Double B	– 6½	– 6½	6½– 6¾
*Grade B	– 6½	– 6½	6½– 6¾
†*Grade C	– 6¼	6 – 6¼	6 – 6¼
*F. O. B. Breckenridge.			
†Prices nominal, no sales being recorded today.			
CALIFORNIA			
75-85, 375-390 E. P. blend	11½–13	11½–13	11½–13

MOTOR FUEL BLENDS

PENNSYLVANIA			
68-70 Grav. 437 E. P. blend	12¼–12½	12¼–12½	12¼–12½
64-66 Grav. 437 E. P. blend	12¼–12½	12¼–12½	12 –12¼
60-62 Grav. 437 E. P. blend	–12	–12	12 –12¼
68-70 Grav. 420 E. P. blend	12¼–12½	12¼–12½	12¼–12½
OKLAHOMA			
64-66 437 E. P. blend	8¼– 8⅝	8½– 8¾	8¾– 9

BURNING OILS

PENNSYLVANIA			
45 Water White Kerosene	8 – 8¼	8 – 8¼	– 8¼
46 Water White Kerosene	8¼– 8¾	8½– 8¾	– 8¾
47 Water White Kerosene	9 – 9¼	9 – 9¼	– 9¼
OKLAHOMA			
41-43 Water White Kerosene	6 – 6¼	– 6	5¾– 6
42-44 Water White Kerosene	– 6¾	6½– 6¾	6½– 6¾
KANSAS			
41-43 w. w. kerosene	– 6½	6¼– 6½	6¼– 6½
42-44 w. w. kerosene	7 – 7¼	6¾– 7¼	6¾– 7¼
NORTH TEXAS			
40-42 Water White Kerosene	– 5¾	– 5¾	5⅝– 5¾
41-43 Water White Kerosene	– 6	5⅞– 6	5¾– 6
NORTH LOUISIANA			
41-43 Water White Kerosene	– 6½	– 6¾	– 6¾
*Nominal			

ARKANSAS	Prices Feb. 7	Prices Jan. 31	Prices Jan. 24
41-43 Kerosene	– 6¾	– 6¾	– 6¾
CALIFORNIA			
38-40 Water White Kerosene	6 – 6½	6 – 6½	6 – 6½
NEW ENGLAND			
**40-43 Water White Kerosene	**– 9¼	**– 9	none available

NEUTRAL OIL

PENNSYLVANIA (Viscosity at 70° F.)			
200 Vis. No. 3 Assoc. Filt.	–32	32	none available for spot delivery
180 Vis. No. 3 Assoc. Filt.	29½–30	none	
150 Vis. No. 3 Assoc. Filt.	26½–27	none	
(Non-Viscous)			
34 Grav. 330-340 Flash	8¼– 8½	8 – 8½	8 – 8½
36 Miners Neutrals 300-305 Flash	7¼– 7¾	7¼– 7¾	7¼– 7¾
OKLAHOMA (Viscosity at 100° F.)			
100 Vis. No. 2 color	7 – 7½	7 – 7½	7 – 7½
150 Vis. No. 3 color	9 –10	9 –10	9 –10
150 Vis. No. 4 color	– 9¾	– 9¾	– 9¾
180 Vis. No. 3 color	10 –11	10 –11	10 –11
180 Vis. No. 4 color	10 –10½	10 –10½	10 –10½
180 Vis. No. 5 color	10 –10¼	10 –10¼	10 –10¼
200 Vis. No. 3 color	10¾–11¾	10¾–11¾	10¾–11¾
200 Vis. No. 4 color	–11½	–11½	–11½
200 Vis. No. 5 color	9¼–11¼	9¼–11¼	9¼–11¼
220 Vis. No. 3 color	12 –13½	12 –13½	12 –13½
220 Vis. No. 4 color	–13	–13	–13
220 Vis. No. 5 color	12 –12¾	12 –12¾	12 –12¾
240 Vis. No. 3 color	14 –15	14 –15	14 –15
240 Vis. No. 4 color	–14½	–14½	–14½
240 Vis. No. 5 color	13 –14	13 –14	13 –14
280 Vis. No. 3 color	16 –17	16 –17	16 –17
280 Vis. No. 4 color	–16½	–16½	–16½
280 Vis. No. 5 color	15 –16	15 –16	15 –16
300 Vis. No. 5-6 color	–17	–17	–17
GULF COASTAL (Viscosity at 100° F; pour test 0)			
100 Vis. No. 2 Color Unfilt. Pale	8 – 9	8 – 9	8 – 9
200 Vis. No. 3 Color Unfilt. Pale	11 –12	11 –12	11 –12
300 Vis. No. 3 Color Unfilt. Pale	12 –13	12 –13	12 –13
500 Vis. No. 3½ Color Unfilt. Pale	14 –15	14 –15	14 –15
750 Vis. No. 4 Color Unfilt. Pale	16 –17	16 –17	16 –17
200 Vis. No. 5½ Color Red Oil	9 –10	9 –10	9 –10
300 Vis. No. 5½ Color Red Oil	10 –11	10 –11	10 –11
500 Vis. No. 6 Color Red Oil	12 –13	12 –13	12 –13
750 Vis. No. 6 Color Red Oil	15 –16	15 –16	15 –16
CALIFORNIA (Viscosity at 100° F.)			
100 Vis. No. 2 color	9 – 9½	9 – 9½	9½–10
100 Vis. No. 3 color	7½– 8	7½– 8	8 – 8½
200 Vis. No. 3 color	9½–10	9½–10	10 –10½
300 Vis. No. 3 color	10½–11	10½–11	11 –11½
450 Vis. No. 3-3½ color	13 –13½	13 –13½	13 –13½
550 Vis. No. 3-3½ color	14½–15	14½–15	15 –15½
600 Vis. No. 3-3½ color	15 –15½	15 –15½	15½–16
100 Vis. No. 5 color	6½– 7	6½– 7	7 – 7½
200 Vis. No. 5 color	8½– 9	8½– 9	9 – 9½
300 Vis. No. 5 color	9 – 9½	9 – 9½	9½–10
400 Vis. No. 6 color	11 –11½	11 –11½	11½–12
500 Vis. No. 6 color	11½–12	11½–12	12 –12½
600 Vis. No. 6 color	12 –12½	12 –12½	12½–13
700 Vis. No. 7 color	14½–15	14½–15	14½–15

CYLINDER STOCKS

OKLAHOMA			
190-200 Vis. at 210° Bright Stock	31 –35	31 –35	31 –35
150-160 Vis. at 210° Bright Stock	27 –31	27 –31	27 –31
600 E Stock 140-150 Vis. —210°	18 –20	18 –20	18 –20
600 Steam Refined Olive Green	8 –11	8 –11	8 –11
600 Steam Refined Dark Green	5½– 7½	5½– 7½	5½– 7½
Black Oil	5 – 6	5 – 6	5 – 6
PENNSYLVANIA (1-inch Immersion Test)			
600 Steam Refined	12 –12¾	12 –12½	12 –12¼
650 Steam Refined	16 –16½	16 –16½	15½–16
600 Flash	20 –20½	20½–21	20 –21
625 Flash	–30	30 –31	–30
600 Warren E	20 –20½	20 –20½	20 –20½
600 Oil City E	18½–19	18½–19	19 –19½
600 D Filtered	25½–26	25½–26	25½–26
Cold Test Stocks (bright filtered)	–37	37 –38	36½–38
Cold Test Stock (dark filtered)	–35	35 –36	34 –35

(Note—Prices of total immersion test goods average 1 to 3 cents per gallon higher.)

LONG RESIDUUM STOCKS

PENNSYLVANIA			
60-65 vis. @ 210, 440-450 flash No. 5½ color	–34	–34	–33½
70-75 vis. @ 210, 450-455 flash No. 6 color	34 –35	–35	–34½
80-85 vis @ 210, 440-450 flash No. 7 color	–36	–36	–35½
80-85 vis. @ 210, 450-460 flash No. 7-8 color	36 –37	–37	–36½
80-85 vis. @ 210, 460-465 flash No. 7 color	37 –38	–38	–37½
95-100 vis. @ 210, 490-495 flash No. 8 color	–39	–39	–38½
**Only one refiner quoting.			

More Activity in Export Markets; Prices Become More Firm

By Special Correspondent
NEW YORK, Feb. 7

EXPORT demand for refinery products was a trifle more active last week. Bulk gasoline steadied and there was less disposition among refiners to shade prices. There were several inquiries from abroad for bulk gasoline and kerosene. That large European distributors will shortly be forced into the market for gasoline is the consensus of opinion among exporters and most refiners. A few small refiners are still nervous over the outlook.

Advancing gasoline tank wagon prices in several parts of the country have gone a long way towards improving the tone of the bulk gasoline market. Kerosene is steadier although export demand is lagging. Gas oil is steady. Lubricating oils were in good demand both at the Gulf and New York. Bunker oil was strong and there was a rumor of an impending price advance.

During the last six months, Europeans have been purchasing more Russian oil than for several years. American refiners are finding competition with these oils much keener in France, England and Germany.

Export Gasoline—New York

Export demand for bulk gasoline was light last week, but a revival of European buying interest is expected to materialize into some good sized movements shortly. A United Kingdom buyer was inquiring for 45,000 barrels of U. S. Motor and 64-66 gravity 375 end point gasoline for March shipment. A large Independent refiner is working on this.

U. S. Motor in bulk at the refineries was fairly firm at 12¼ cents a gallon. Stocks are moderate and prices firm. Cased gasoline demand was more active and a leading refiner is reported to have sold 50,000 cases of gasoline and kerosene for March shipment to the Near East.

Export Gasoline—Gulf Ports

Export demand was better last week. A leading Independent was reported to have closed a cargo of 50,000 barrels of 61-63 gravity 390 end point for April shipment to the United Kingdom at around 11½ cents a gallon. Competition among refiners was not so keen as in the preceding week. With the spring nearing, few of the refiners are offering beyond 90 day shipment.

At the end of the week U. S. Motor was held at 10½ cents a gallon; 60-62, 400 end point at 11¼ cents; 61-63, 390 end point at 11½ cents and 64-66, 375 end point at 12½ cents a gallon. There was an inquiry from France for 55,000 barrels of U. S. Motor and 64-66, 375 end point gasoline, and prime and water white kerosene for March shipment but this has not yet materialized. A leading Independent refiner sold 100,000 cases of prime and water white kerosene, and U. S. Motor and 64-66 gasoline for shipment over the next 60 days to Australasia. U. S. Motor in cargo lots was held at $2 a case and 64-66 at $2.20.

Export Kerosene—New York

Export demand for kerosene lagged but prices were fairly well maintained. Most foreign buying orders were for small lots of barreled kerosene for prompt shipment. Leading refiners were demanding 9 cents a gallon for 41-43 prime and water white at the Atlantic Seaboard terminals while 43-45 water white was firm at 9½ cents refineries. No cargo sales have been reported in several weeks. Cased kerosene demand was slightly active. A leading Independent sold 45,000 cases of prime and water white kerosene for March-April shipment to South America. Near Eastern buyers have been inquiring for larger quantities of cased kerosene but purchased hand-to-mouth.

Export Kerosene—Gulf Ports

Demand for bulk kerosene lagged but prices were steady. There is a good movement against old contracts. Interest is centering on cased kerosene. An Independent refiner is negotiating to sell 100,000 cases of kerosene for March shipment to the Orient. Another Independent sold 50,000 cases for February-March shipment to South America. Prime white was quoted at $1.60 a case and water white at $1.75 a case in cargo lots.

Bulk prime was offered at 7½ to 7¾ cents and 44 water white was firm at 9 to 9¼ cents a gallon. Continental buyers have been purchasing as needed and with the winter drawing to a close no heavy buying is expected in the immediate future.

Lubricants—New York

Pennsylvania cylinder stocks are in growing demand with both foreign and domestic buyers more inclined to purchase ahead. Pennsylvania 600 steam refined unfiltered cylinder oil in barrels New York was in better demand than in the preceding week, at 19½ to 20 cents a gallon, with a possibility of still doing 19 cents in one or two directions.

Neutral oils have been holding their own. Bright stock is in good demand. Export buying is on a larger scale although most foreign orders have been for 500 to 700 barrels for nearby shipment.

Lubricants—Gulf Ports

Zero cold test lubricants were less active but refiners were firm in their ideas. Domestic demand has been fully up to expectations, and while export buying has been light refiners feel that because of the improved European inquiry for Texas lubes, there will be better demand soon. A British buyer inquired for 40,000 barrels of assorted lubricants but did not buy. French buyers have been purchasing more steadily and in view of the good domestic demand prices are expected to remain steady.

Wax Market—New York

Demand for paraffin waxes continued to be disappointing last week, and the tendency was downward. Export business was almost at a standstill. Shipments have been largely against old contracts. European buyers are finding it much cheaper to purchase Asiatic waxes and are consequently buying little or nothing over here. Domestic buyers are operating along hand-to-mouth lines.

White crude scale 122-124 A.m.p. was freely offered at 4½ cents a pound while 124-126 was easy at 4.60 cents. Match wax was dull. Stocks of fully refined waxes are much in excess of the demand. No business to speak of was reported. South American buyers have been buying as needed, only.

Wax Market—Gulf Ports

Gulf refiners reported a further slump in paraffin waxes. Export buying was spasmodic and generally below expectations. Prices remained weak for virtually all grades. South American buyers have been keeping in close touch with the market but with a view of studying the situation rather than to buying. At the end of the week white crude scale 124-126 A.m.p. was offered at 4.45 cents a pound; semi-refined 124-126 at 4½ cents, and yellow 124-126 at 4⅜ cents a pound. Fully refined grades were quoted as follows: 123-125 and 125-127 A.m.p. at 4⅞ cents; 128-130 at 5 cents; 133-135 at 5¾ cents, and 135-137 at 6 cents.

Bunker Oil—New York

New York harbor refiners reported improved domestic demand for bunker oil but no export buying of consequence developed. There is a heavy contract movement and the trade has been rife with rumors of impending advances. However, Saturday grade C was still offered at $1.75 a barrel f.o.b. refineries and $1.81½ a barrel f.a.s. New York harbor. Spot bunker oil is offered more spar-

ingly. Diesel oil demand was a shade better at $2.40 a barrel at refinery.

Bunker Oil—Gulf Ports

Demand for grade C bunker oil was more active although most of the buying was for domestic account. At New Orleans the f.o.b. price was $1.65 a barrel for bunkering and $1.50 to $1.55 a barrel for cargoes. At Tampico grade C was held at $1.60 a barrel f.o.b., including taxes, an advance of 5 cents over the week. In cargoes the price was nominal as nothing was offered. Heavy Panuco crude oil was quoted at $1.40 a barrel in cargoes f.o.b. Tampico, taxes to be added.

Gas Oil—New York

Demand for gas oil was more spasmodic and the price tendency was downward. Most large buyers have been purchasing as needed, and were not inclined to purchase ahead. Refiners were asking 6¼ cents a gallon for 36-40 at the refineries while 28-34 was quoted at 5¾ cents a gallon, same basis. No export buying developed.

Gas Oil—Gulf Ports

Gulf gas oil markets were less active than during the previous week. Some of the refiners were busy filling outstanding contracts but most reported quiet conditions. As a rule prices were easy. Export demand lagged, and while it was rumored that a leading Independent refiner had sold 45,000 barrels of gas oil for February shipment to the United Kingdom, confirmation was lacking. Refiners were offering 32 plus dark gas oil at 4⅞ cents a gallon while 26-28 translucent and straw were offered at 5 cents.

Petrolatums

Demand for snow white petrolatum was more active toward the end of last week. Large British and French toilet preparation manufacturers have been buying more. Domestic demand is spasmodic. Medicinal oils were steady under a routine domestic demand.

Eastern and Central Kentucky Markets

ASHLAND and LEXINGTON, Feb. 7.—Gasoline in eastern Kentucky refining district is improving. Kerosene sales have been unusually heavy during the past week. February fuel oil output is committed.

Fairly good movement of all commodities was reported during the past week in central Kentucky refinery markets. Prices are unchanged.

Quotations on Feb. 7 were:

	Eastern	Central
58-60 gasoline	11½	10¾
60-62 gasoline	12	
64-66 gasoline	12½	
68-70 gasoline	13½	
41-43 w.w. kerosene	8½	8¼
34-36 gas oil	6¼	6
24-26 fuel oil	5	
23-25 fuel oil		5
14-16 fuel oil	4½	

Complete Export Markets

New York Export Market

GASOLINE	Feb. 7	Jan. 31
U. S. Motor Tank cars Ref.	12¼–12½	12¼
U. S. Motor cases	27.40	–27.40
California grade U. S. Motor F. O. B. N. Y. Cargoes	11½–11¾	–11½
KEROSENE		
43-45 150 W. W. Tank cars Ref.	09½	–09¼
41-43 Water White Bulk Ref.	09.	–09.
43-45 150 W. W. Cases	19.15	–19.15
42-44 110 S. W. Cases	18.65	–18.65
GAS OIL		
36-40, Bulk Refinery	–06¼	–06¼
28-34, Bulk Refinery	–05¾	–05¾
MEXICAN BUNKER OIL		
Grade C. f. o. b. ref. Bulk	–1.75	–1.75
Diesel Oil f. o. b. ref. Bulk	–2.40	–2.40

LUBRICATING OILS

The following prices are cooperage basis f. o. b. New York, products being manufactured by inland refineries.

CYLINDER OILS (Bbls.)

1 inch Immersion Test; All Penna. Products

Bright Stock dark	43½	–43½
Filtered D 600	34½	–34½
Filtered E 600-Warren	28	–28
Unfiltered 600 s. r.	19½–20	–20
Unfiltered 650 s. r.	24½	–24½
600 Flash s. r.	28	–28
630 Flash	38	–38

RED PARAFFIN (Bbls.)

(Viscosity at 70)

300 vis. No. 5 color	–19½	–19½
250 vis. No. 5 color	–18	–18
475 Viscosity No. 5 color	–23	–23

NEUTRAL OILS (Bbls.)

(Viscosity at 70)

200 vis. at F. Pale. No. 3 color	–39	–39
180 Pale. No. 3 color	–37	–37
150 Pale. No. 3 color	–35	–35

BLACK OIL (Bbls.)

25-30 cold test	13¼	–13¼
15 cold test	14¼	–14¼

MEDICINAL OILS

(Includes Price of Drums)
(Penna. Stocks)

	Feb. 7	Jan. 31
Domestic 875-.885 s. g.	– .85	– .85
Domestic 865-.870 s. g.	.75– .80	.75– .80
Russian 885-.890 s. g. 325-330 vis.	1.00–1.10	1.00–1.10

WAXES

(Penna. Stocks)
(In Cents per Pound, F. A. S. Carload Lots)

WHITE CRUDE SCALE (Shipped in Bbls.)		
122-124 A. m. p.	–04½	–04⅝
124-126 A. m. p.	–04.60	–04⅝
MATCH		
105-108 A. m. p.	.05¾	.05¾
FULLY REFINED (Shipped in Burlap Bags)		
123-125 A. m. p. Philadelphia.	–05	–05
125-127 A. m. p.	–05	–05
128-130 A. m. p.	–05⅛	–05¼
130-132 A. m. p.	–05⅛	–05⅛
133-135 A. m. p.	–06	–06
135-137 A. m. p.	–06¼	–06¼
YELLOW CRUDE SCALE		
124-126 A. m. p.	.04⅜	–04½

PETROLATUMS

(Penna. Stocks)
Per Pound

Dark Green	01¾	01¾
Veterinary	03	03
Light Amber	03⅝	03⅝
Dark Amber	03¼	03¼
Cream	06	06
Lily White	07⅛	07⅛
Snow White	08⅛	08⅛

Gulf Export Market

GASOLINE
F. O. B. Seaboard
(Shipments of 20,000 Bbls. and over)

	Feb. 7	Jan. 31
U. S. Motor, Bulk	10½	–.10½
60-62 400 e. p. Bulk	11¼	–.11¼
61-63 390 e. p. Bulk	11½	–.11½
64-66 375 e. p. Bulk	12½	–.12½
U. S. Motor, Cases (cargo lots)	2.00	2.00
64-66 Cases (cargo lots)	2.20	2.20
KEROSENE		
Water White, 43-45 Bulk	09¼	–09¼
Prime White, 41-43 Bulk	07½	–07½
Water White, cases (cargo lots)	1.75	1.70
Prime White, cases (cargo lots)	1.60	1.60
DOMESTIC GAS AND BUNKER OIL		
26-28, gravity, Bulk*	05–05⅛	–05
32 plus, bulk, Dark	04⅞	–04⅞
Grade C, Bunker oil	1.65	–1.65
Cargoes	1.55	–1.55

*Translucent through neck of a 4 oz. bottle.

MEXICAN CRUDE AND BUNKER OILS
F. O. B. Steamer Tampico

Heavy, Panuco crude Taxes to be added	nominal	nominal
Grade C, Bunker oil Taxes paid cargoes	nominal	nominal
Grade C, Bunker oil, F. O. B. Tampico, For Bunkering Purposes, taxes paid	1.60	1.55–1.60

SOUTH TEXAS
(Viscosity at 100° F; cold test 0)
(Tanker, F. O. B. Houston)

*LUBRICATING OILS	Feb. 7	Jan. 31
100 Vis. No. 2 Unfiltered Pale	08	08
150 Vis. No. 2½ Unfiltered Pale	10	10
200 Vis. No. 3 Unfiltered Pale	10½	10½
300 Vis. No. 3 Unfiltered Pale	12	12
500 Vis. No. 3½ Unfiltered Pale	14	14
200 Vis. No. 5½ Red Oil	09½	09½
300 Vis. No. 5½ Red Oil	10½	10½
500 Vis. No. 6 Red Oil	12	12

*These prices are entirely nominal owing to wide fluctuations.

Pacific Export Market

(Cargo lots quotations at seaboard, Los Angeles Gravity test on A. P. I. scale)

	Feb. 7	Jan. 31
Gasoline, U. S. Motor— 53°-55°	8½– 9	08½– 9
Gasoline, U. S. Motor— blends and special cuts	9½–11	9¼–10
Gas Oil, 30°—34° per bbl.	1.22½–1.30	1.30–1.35
Diesel Oil, 27°—plus per bbl.	1.00–1.15	1.00–1.15
Bunker Oil, 14°—18° bbls.	.80–1.00	.80–1.00
Fuel Oil, 14°—18° per bbl.	.80–1.00	.80–1.00
Kerosene, W. W. 38°—40° per gal., 125-150 flash test	.06 –06½	.05½– .06
Cased Goods		
Gasoline, U. S. Motor	2.25–2.40	–2.25
Kerosene, W. W. 38°—40° per case, 125-150 flash	1.50–1.60	1.45–1.55

N. Y. Domestic Market

The following light oil, gas and fuel oil prices are F. O. B. New York refineries, being products made from Domestic (including California) and Mexican Crudes.

	Feb. 7	Jan. 31
U. S. Motor Gasoline, Tank Cars Delivered greater N.Y.	–13¼	–13¼
U. S. Motor Gasoline, Tank Cars Bayonne	–12¾–12½	–12¾
U. S. Motor Tank Cars, *Atlantic Seaboard Terminals	–12¾–12½	–12¾
Kerosene, 44 150 W. W. Tank Cars de'd greater N.Y.	–10¼	–10¼
41-43, Bulk Ref. W. W.	–09	–09
Grade C Bunker f.o.b. N.Y. Ref	–1.75	–1.75
Diesel Oil f. o. b. Refinery	2.40	2.40
Gas Oil, 36-40, Bulk Refinery..	–06¼	–06¼
Gas Oil, 28-34, Bulk Refinery..	–05¾	–05¾
Furnace Oil, 38-42, Bulk, Refinery	–07½	–07½

*New York, Philadelphia, Portsmouth, Va. Charleston, S. C.

Market Section

Crude Oil Prices, as Posted by Major

EASTERN FIELDS

(Posted by Joseph Seep Purchasing Agency)

Penna. Grade Oil in New York Transit Lines (Alleghany, N. Y. District)	$3.40
Bradford District Oil in National Transit Lines (Bradford District)	3.40
Penna. Grade Oil in National Transit Lines (Other Pennsylvania)	3.30
Penna. Grade Oil in Southwest Penna. Pipe Lines (Other Pennsylvania)	3.30
Penna. Grade Oil in Eureka Pipe Lines (West Virginia)	3.25
Penna. Grade Oil in Buckeye Pipe Lines (Macksburg, O. district)	3.10
Keister Grade in National Transit Lines (Butler Co.)	1.80
Cabell Grade in Eureka Pipe Lines (West Virginia)	2.10
Corning Grade in Buckeye Pipe Lines (Ohio)	2.25
Corning, O. heavy grade	2.15
*Somerset Oil in Cumberland Pipe Lines (Kentucky)	2.20
Ragland Grade in Cumberland Pipe Lines (Kentucky)	.95

*Somerset oil run prior to Oct, 1, 1922 takes price of 6 cents lower than above quotations.

(Posted by Stoll Oil Refining Co.)

Oil City, Ky. oil in Stoll lines	$2.20

CENTRAL STATES FIELDS

Posted by Ohio Oil Co.

Wooster	$2.25	Plymouth	$1.63
Lima	2.21	WesternKentucky	1.83
Waterloo	1.35	*Canadian Petrolia	2.61
Indiana	1.98	*Oil Springs	2.68
Princeton	2.10	*Posted by Imperial Oil Ltd.	
Illinois	2.10		

OKLAHOMA, KANSAS And NORTH TEXAS

Prices of Prairie Oil & Gas Co.
(In Oklahoma, Kansas, North and East Central Texas)

Effective Nov. 17, 1296

28-28.9	$1.50	34-34.9	$1.80
29-29.9	1.55	35-35.9	1.85
30-30.9	1.60	36-36.9	1.90
31-31.9	1.65	37-37.9	1.95
32-32.9	1.70	38-38.9	2.00
33-33.9	1.75	39-39.9	2.05
40-40.9	$2.10	47-47.9	$2.45
41-41.9	2.15	48-48.9	2.50
42-42.9	2.20	49-49.9	2.55
43-43.9	2.25	50-50.9	2.60
44-44.9	2.30	51-51.9	2.65
45-45.9	2.35	52 and above	2.70
46-46.9	2.40		

Above schedule met by Sinclair and Gulf on Nov. 17.

Humble Oil & Refining Co. Prices
(Ranger, North Texas, Mexia, Powell, Richland, Wortham, Lytton Springs, Currie, Morar and Nocona crudes all in Texas.)

On Nov. 1, Humble first posted the price schedule adopted by Prairie on Nov. 17, except that Humble is paying 5c less for each degree of gravity on oil below 28°.

Mirando, Tex	$1.25

The Texas Co. posted same gravity and price schedule in Oklahoma, North, North Central and Central Texas on Nov. 5 as Humble, excepting it is paying $1.40 for all oil below 28° gravity in Texas fields.

Magnolia Petroleum Co.
(In Oklahoma, Kansas and North and East Central Texas)

Same grades and prices as posted by Prairie excepting that Magnolia is paying $1.30 for all oil below 28° gravity, effective Nov. 2.

Corsicana heavy	$1.25
Iatan, Tex	1.50

Carter Oil Co.
(Oklahoma and Kansas)

On Nov. 2, Carter posted same gravity and price schedule as Prairie is now maintaining.

PANHANDLE, TEXAS
Humble Oil & Refining Co.

Hutchinson, and Carson Counties	$1.25		
Gray County:		Wheeler County:	
28-28.9	$1.00	28-28.9	$ .90
29-29.9	1.05	29-29.9	.95
30-30.9	1.10	30-30.9	1.00
31 31.9	1.15	31-31.9	1.05
32-32.9	1.20	32-32.9	1.10
33-33.9	1.25	33-33.9	1.15
34-34.9	1.30	34-34.9	1.20
35-35.9	1.35	35-35.9	1.25
36-36.9	1.40	36-36.9	1.30
37-37.9	1.45	37-37.9	1.35
38-38.9	1.50	38-38.9	1.40
39-39.9	1.55	39-39.9	1.45
40-40.9	1.60	40-40.9	1.50
41-41.9	1.65	41-41.9	1.55
42-42.9	1.70	42-42.9	1.60
43-43.9	1.75	43-43.9	1.65
44 and above	1.80	44 and above	1.70

Magnolia Petroleum Co. posted flat price of $1.25 for all Panhandle Crude on Sept. 22, and Kay County Gas Co. on Oct. 4.

WEST TEXAS
(Crane, Upton and Crockett Counties)
Humble Oil & Refg. and Kay County Gas Co.

Below 26	$ .80	31-31.9	$1.10
26-26.9	.85	32-32.9	1.15
27-27.9	.90	33-33.9	1.20
28-28.9	.95	34-34.9	1.25
29-29.9	1.00	35-35.9	1.30
30-30.9	1.05	36 and above	1.35

NORTH LOUISIANA—ARKANSAS FIELDS
***Prices of Standard Oil Co. of Louisiana**
Caddo, Homer, Haynesville, Bull Bayou, El Dorado, Crichton and De Soto
Effective Nov. 4

Below 28	$1.40	40-40.9	$2.10
28-28.9	1.50	41-41.9	2.15
29-29.9	1.55	42-42.9	2.20
30-30.9	1.60	43-43.9	2.25
31-31.9	1.65	44-44.9	2.30
32-32.9	1.70	45-45.9	2.35
33-33.9	1.75	46-46.9	2.40
34-34.9	1.80	47-47.9	2.45
35-35.9	1.85	48-48.9	2.50
36-36.9	1.90	49-49.9	2.55
37-37.9	1.95	50-50.9	2.60
38-38.9	2.00	51-51.9	2.65
39-39.9	2.05	52 and above	2.70
Smackover, below 24			$1.10
" 24-24.9			1.35
" 25-25.9			1.40
" 26-26.9			1.45
" 27 and above			1.50
Bellevue			1.40
Cotton Valley			1.20
**Urania, La			1.10
†Calion (East El Dorado)			.95

*Gulf and La. Oil Refg. Corp. met S. O. La. prices on Nov. 4 and The Texas Co. and Magnolia Pet Co. met on Nov. 5.

**Posted by Louisiana Oil Refining Corp.

†Posted by Gulf.

STEPHENS, ARKANSAS
Posted by Atlantic Oil Producing Co. and Louisiana Oil Refining Corp.

Below 28	$1.30	29-29.9	$1.45
28-28.9	1.40	30 and above	1.50

GULF COASTAL and SPINDLETOP
Posted by Humble Oil & Refining Co.

Grades A	$1.40	29-29.9	$1.65
Grades B:		30-30.9	1.70
Below 25	1.40	31-31.9	1.75
25-25.9	1.45	32-32.9	1.80
26-26.9	1.50	33-33.9	1.85
27-27.9	1.55	34-34.9	1.90
28-28.9	1.60	35 and above	1.95

Fields classified as A and B are Goose Creek, Hull, Liberty, West Columbia, Orange, Boling and Pierce Junction. All other fields are Grades A only.

Magnolia Petroleum is paying same prices in Spindletop as Humble, except that its top grade is 31-31.9 at $1.75, effective Nov. 16.

Tanker Rates From West Coast Are Again to be Increased

Staff Special

LOS ANGELES, Feb. 5.—Although quotations on petroleum products in California have not changed during the past few weeks other than in extremely minor details, in face of the season, the situation continues stable.

Shipments continue to be encouraging, regardless of the very tight charter rate. Those who have tankers for charter during the past month have been asking $1.25 to $1.35 per barrel for movement to east coast, this charge including canal tolls, but recent rumors are that this asking price is to be again increased.

Latest reports have it that as high as 4 cents a gallon is to be asked, and that certain dickers are now in progress, with this price asked. Such a rate would work against the California seller, in that he must sell at a figure that would compete favorably with Mid-Continent prices, plus freight to Atlantic seaboard.

California companies are fast building up their own tanker fleets, with some company buying a new tanker almost every week. It is reported that the shipping board has refused to sell idle tankers, holding them for any emergency. Even those sold by the board recently brought rather high prices. Western Oil & Refining Co. is now arranging for loading facilities at Los Angeles harbor and reports are that the company is dickering for one or more tankers, for use in foreign trade.

During the week ending Jan. 29, a total of 31 tankers left Los Angeles harbor, carrying a total of 2,046,079 barrels of all petroleum products. The total was made up of 775,360 barrels of crude, 938,768 barrels of fuel, 216,349 barrels of gasoline, 4082 barrels of Diesel and 71,520 barrels of gas oil. Pacific foreign drew 54,300 barrels of crude, 297,124 barrels of fuel and 44,082 barrels of Diesel. Atlantic domestic drew 84,887 barrels of fuel and 71,520 barrels of gas oil, while Atlantic foreign drew 107,878 barrels of crude, 158,087 barrels of fuel and 100,420 barrels of gasoline. The rest went to points on Pacific domestic coast.

Gulf Lube Prices Firmer

HOUSTON, Feb. 5.—Gulf Coastal lubricant manufacturers report sales volumes holding up satisfactorily. They say prices are firmer at unchanged levels, there being less disposition to shade quotations on jobbing business. Although foreign buyers have shown increased interest by their inquiries no sales were revealed.

Purchasers, in All Fields (in Effect, Feb. 7, 1927)

GULF COASTAL and SPINDLETOP
Prices of The Texas Co.

Grades A	$1.40	*Grades B	$1.40
‡Grades B (light crude):			
35-35.9	$1.95	38-38.9	$2.10
36-36.9	2.00	39-39.9	2.15
37-37.9	2.05	40 and above	2.20

*Grades B include all heavy crudes which do not meet tests for Grades A or for Gulf Coast light crude.

‡The Texas Co.'s gravity and price schedule on all below 35° is same as Humble's postings on Grades B.

ROCKY MOUNTAIN FIELDS
Prices of Ohio Oil Co. and Midwest Refining Co.

‡Salt Creek	29-29.9	$1.55
" "	30-30.9	1.60
" "	31-31.9	1.65
" "	32-32.9	1.70
" "	33-33.9	1.75
" "	34-34.9	1.80
" "	35-35.9	1.85
" "	36-36.9	1.90
" "	37 and above	1.95
Elk Basin		2.00
Grass Creek light		2.00
Big Muddy		$1.85
Lance Creek		2.00
Rock Creek		1.85
Mule Creek		1.45
Rex Lake		1.25
‡Osage		2.00
‡Cat Creek, Mont.		2.00
Sunburst, Mont.		1.85
‡Hogback, N. Mex.		2.45
Artesia, N. Mex.		1.65

‡Posted by Midwest Refining Co. Midwest also buys Grass Creek light and Elk Basin.

The Texas Co. buys Salt Creek and Big Muddy crude.

CALIFORNIA
Standard Oil Co. of California

Gravity	Signal Hill Huntington Beach	Inglewood Torrance	Whittier La Habra	Newhall, McKittrick, Kern River	Olinda-Brea Canon, Richfield	Athens-Rosecrans Dominguez	Monte-bello	Coyote Hills	Santa Fe Springs	Midway Sunset Elk Hills
14-14.9	$ .85	$ .85	$ .85	$ .75	$ .85	.....	$ .85	$ .85	.....	$ .75
15-15.9	.87	.87	.85	.75	.87	.....	.85	.85	.....	.75
16-16.9	.90	.90	.85	.75	.90	.....	.85	.85	.....	.75
17-17.9	.94	.94	.85	.75	.94	.....	.85	.85	.....	.75
18-18.9	.98	.98	.86	.75	.98	.....	.86	.86	.....	.75
19-19.9	1.04	1.04	.87	.75	1.04	.....	.87	.87	.....	.75
20-20.9	1.10	1.10	.89	.....	1.10	.....	.89	.90	.....	.82
21-21.9	1.16	1.16	.91	.....	1.16	.....	.91	.98	.....	.90
22-22.9	1.22	1.22	.94	.....	1.22	.....	.94	1.06	.....	1.00
23-23.9	1.28	1.28	.....	.....	1.28	.....	.97	1.14	.....	1.11
24-24.9	1.34	1.34	.....	.....	1.34	$1.34	1.01	1.22	$1.02	1.22
25-25.9	1.40	1.40	.....	.....	1.40	1.40	1.05	1.30	1.08	1.33
26-26.9	1.46	1.46	.....	.....	1.46	1.46	1.09	1.38	1.16	1.44
27-27.9	1.52	1.52	.....	.....	1.52	1.52	1.13	1.46	1.24	1.55
28-28.9	1.58	1.58	.....	.....	1.58	1.58	1.17	1.54	1.32	1.66
29-29.9	1.64	.....	.....	.....	1.64	1.64	1.21	1.62	1.40	1.77
30-30.9	1.70	.....	.....	.....	1.70	1.70	1.25	1.70	1.48	1.88
31-31.9	1.76	.....	.....	.....	.....	1.76	.....	.....	1.60	1.99
32-32.9	1.84	.....	.....	.....	.....	1.84	.....	.....	1.72	2.10
33-33.9	.....	.....	.....	.....	.....	1.92	.....	.....	1.84	2.21
34-34.9	.....	.....	.....	.....	.....	2.00	.....	.....	1.96	.....
35-35.9	.....	.....	.....	.....	.....	2.08	.....	.....	2.08	.....
36-36.9	.....	.....	.....	.....	.....	2.16	.....	.....	2.16	.....
37-37.9	.....	.....	.....	.....	.....	2.24	.....	.....	2.24	.....
38-38.9	.....	.....	.....	.....	.....	2.34	.....	.....	2.34	.....
39-39.9	.....	.....	.....	.....	.....	2.44	.....	.....	2.44	.....
40-40.9	.....	.....	.....	.....	.....	2.54	.....	.....	.....	.....
41-41.9	.....	.....	.....	.....	.....	2.64	.....	.....	.....	.....
42-42.9	.....	.....	.....	.....	.....	2.74	.....	.....	.....	.....

Santa Maria and Ventura Posted by Union Oil Co.

Gravity	Lost Hills	Coalinga	Wheeler Ridge	Santa Maria	Ventura
14-14.9	$ .75	$ .75	$ .75	$ .85	$ .85
15-15.9	.75	.75	.75	.85	.85
16-16.9	.75	.75	.75	.85	.85
17-17.9	.75	.75	.75	.85	.85
18-18.9	.75	.75	.75	.85	.85
19-19.9	.75	.75	.75	.85	.85
20-20.9	.82	.79	.78	.90	.90
21-21.9	.90	.90	.86	.81	.97	.97
22-22.9	1.00	1.00	.93	.85	1.04	1.04
23-23.9	1.11	1.11	1.00	.89	1.11	1.11
24-24.9	1.22	1.22	1.07	.93	1.18	1.18
25-25.9	1.33	1.33	1.14	.97	1.25	1.25
26-26.9	1.44	1.44	1.21	1.01	1.32	1.32
27-27.9	1.55	1.55	1.28	1.05	1.39	1.39
28-28.9	1.66	1.66	1.35	.....	1.46	1.46
29-29.9	1.77	1.77	1.42	.....	1.53	1.53
30-30.9	1.88	1.88	1.49	.....	1.60	1.60
31-31.9	1.99	1.99	1.56	.....	.....	1.67
32-32.9	2.10	2.10	1.63	.....	.....	1.73
33-33.9	2.21	2.21	1.70	.....	.....	1.79
34-34.9	2.32	1.77	.....	.....	.....	1.85
35-35.9	.....	1.84	.....	.....	.....	1.92
36-36.9	.....	.....	.....	.....	.....	.....
37-37.9	.....	.....	.....	.....	.....	.....
38-38.9	.....	.....	.....	.....	.....	.....
39-39.9	.....	.....	.....	.....	.....	.....
40-40.9	.....	.....	.....	.....	.....	.....
41-41.9	.....	.....	.....	.....	.....	.....
42-42.9	.....	.....	.....	.....	.....	.....

*Union Oil Co. also purchases Long Beach Crude and is maintaining the same gravity and price schedule in that field as the Standard maintains in Signal Hill and Huntington Beach fields. The Union also buys and pays the same prices as the Standard in the Rosecrans-Dominguez fields, on gravities ranging from 14 degrees to and including 24.9 degrees and in Santa Fe Springs, on gravities ranging from 20 to and including 23.9 degrees.

REFINERS' and COMPOUNDERS' SUPPLIES

Following are the average market prices for the week on materials used by refiners and compounders f. o. b. shipping point as effective this date.

Refiners' Supplies

	Feb. 7	Jan. 31
Soda Ash light 58% bags.cwt.	$1.32½	$1.32½
Silicate of Soda 60 deg. drums.....cwt.	–$1.65	–$1.65
Sal Soda wks.....	.90– 1.10	.90– 1.10
Caustic Soda 76% solid..cwt.	– 3.00	– 3.00
Chloride of Lime.....cwt. works.....	– 2.00	– 2.00
Sulphuric Acid 60 deg. tank cars f. o. b. shipping point.....per ton	10.50–11.00	10.50–11.00
Liquid Chlorine tank cars works.....lb.	– .04	– .04

Compounders' Supplies (Open Market)

Vegetable Oils—

Linseed carloads spot....lb.	10.5	10.7
March.....	10.5	10.7
Tanks, spot.....	9.7	10.0
*Soya Bean Tanks, Coast.lb.	09½	09½
Castor Oil—		
No. 1 Carlots, Bbls.....	–.14	–.13½
No. 3 Carlots, Bbls.....	–.13½	–.13
Animal Oils—		
English Degras.....	–.05¾	–.05½
Domestic Degras, bbls., carloads.....lb.	–.04¾	–.04½
*Horse.....lb.	–.09	–.08
Oleic Acid—		
Dist. Bbls.....lb.	.09½–.09¾	.09½–.09¾
Saponified Bbls.....lb.	.09¾–.10	.09¾–.10
Lard Oils—		
Prime		
Winter Strained. to 1½ffa.40-45c.t.lb.	.15	.15⅛
Extra Winter Strained. 2 to 4½ffa.40-45c.t.lb.	.13¾	.13¾
Extra..... 4 to 5 ffa.40-45c.t.lb.	.11¾	.12¼
Extra No.1. 7 to 10 ffa.40-50c.t.lb.	.10¾	.10¾
No. 1.....15 to 18 ffa.40-45c.t.lb.	.10½	.10½
No. 2.....22 to 23 ffa.40-45c.t.lb.	.10	.10
Prime Edible Tallow under 1⅞ffa. 40-45c.t.N.Y.....lb.	–.08½	–.08½
Tallow acidless.....lb.	–.10¼	–.10¼
Lard Stearine.....lb.	–.16	–.16
Oleo Stearine.....lb.	–.09¾	–.09½
Neatsfoot Oil—		
Pure.....bbls.-lb.	.12¾	.12¾
Extra.....do lb.	.10¾	.10¾
No. 1.....bbls.-lb.	.10½	.10½
Cold pressed.....lb.	.16¼	.16¼
Fish Oils—		
Menhaden Oil		
Light pressed.....gal.	–.58	–.58
White.....gal.	–.63	–.63
Yellow bleached.....gal.	–.61	–.61
Whale, extra winter bleached.....gal.	–.82	–.82
Naval Stores—		
Turpentine, N. Y.....gal.	–.79	–.81
Turpentine†.....gal.	–.73	–.75
Rosin, B. N. Y.....bbl.	12.30	12.75
Rosin, F. N. Y.....bbl.	12.40	12.00
Rosin, B†.....bbl.	10.80	11.00
Rosin, F†.....bbl.	10.80	11.20
Rosin Oil 1st run.....gal.	.67	.67
Rosin Oil 2nd run.....gal.	.72	.72
Pine Tar—		
Kiln Burnt.....bbl.	16.00	16.00
Retort.....bbl.	16.00	16.00

†Savannah, Ga., market.
*Nominal.

Alcohol—Denatured—

Formula 5		
Bbls.....gal.	–41	–42
Drums.....gal.	–34	–35

OIL STOCKS AND FINANCES

National Petroleum News

South West Penn. Lines Increase Profit; Eureka Cuts Loss

Staff Special

CLEVELAND, Feb. 7

EARNINGS of the South West Pennsylvania Pipe Lines in 1926 were almost 25 per cent larger than in 1925, and were the second best among the southern group of eastern pipe line companies.

The Cumberland Pipe Line Co.'s earnings, as reported in last week's issue, were largest although a little less a share than in 1925. Eureka Pipe Line Co. reduced its net loss from $208,352 in 1925 to $13,673 last year.

The Southern Pipe Line Co.'s profits fell from $191,266 to $150,989 due to the disposal of approximately $4,300,000 of investments in connection with the reduction in its capital stock by 50 per cent. However, the rate of Southern's earnings rose from 1.91 per cent in 1925 to 3 per cent in 1926 on the par value of stock outstanding at the end of each year.

The Southern lost $602,710 on the sale of securities last year and the value at which it carried securities on its books, Dec. 31, 1926, was still $13,157 more than the market value on that date, President Forrest M. Towl reported to stockholders.

Net profits of the South West Pennsylvania Lines were equal to $7.12 on each $100 share compared with $5.74 in 1925.

Eureka, which gathers and transports crude oil in West Virginia, reported larger runs in 1926 because of new pools than in any of the last three years. Its runs were 4,490,608 barrels, compared with 4,179,228 in 1925, and 4,300,641 in 1924.

Market value of Eureka's investments increased $136,275 last year, President Towl reported. This appreciation, however, is not shown in the balance sheet published herewith.

Income accounts for 1926 and 1925 compare:

S. W. PA. PIPE LINES

	1926	1925
Profit	$249,362	$200,906
Dividends	140,000	140,000
Surplus	$109,362	$ 60,906
Previous surplus	566,856	607,577
Total surplus	$676,218	$668,483
Adjustments	188,620	101,627
B. & L. surplus	$487,598	$566,856

SOUTHERN PIPE LINE CO.

	1926	1925
Profit	$150,989	$191,266
Dividends	100,000	400,000
Surplus	$ 50,989	*$208,734
Previous surplus	988,172	1,196,906
Total surplus	$1,039,161	$988,172
Tax adj. previous yrs.	3,506	.....
Loss sale of securities	602,710	.....
P. & L. surplus	$432,945	$988,172

*Deficit.

EUREKA PIPE LINE CO.

Loss	$ 13,673	$208,352
Dividends	200,000	200,000
Deficit	$213,673	$408,352
P. & L. surplus	2,613,512	2,827,185

Balance sheets as of Dec. 31, 1926 and 1925, compare:

S. W. PA. PIPE LINES

ASSETS

Plant	$4,215,876	$4,205,417
Other investments	1,690,673	1,500,766
Accounts receiv.	185,777	394,231
Cash	211,151	86,104
Total	$6,303,477	$6,186,518

LIABILITIES

Capital stock	$3,500,000	$3,500,000
Depreciation	2,209,375	2,066,738
Accounts payable	106,503	52,924
Surplus	487,599	566,856
Total	$6,303,477	$6,186,518

SOUTHERN PIPE LINE CO.

ASSETS

Plant	$5,950,950	$5,969,671
Other investments	3,234,586	7,524,983
Accounts receiv.	78,878	120,146
Cash	98,717	51,675
Total	$9,363,131	$13,666,475

LIABILITIES

Capital stock	$5,000,000	$10,000,000
Stock reduction acct.	1,082,190	.....
Depreciation	2,842,312	2,677,886
Acc'ts payable	5,684	417
Surplus	432,945	988,172
Total	$9,363,131	$13,666,475

EUREKA PIPE LINE CO.

ASSETS

Plant	$10,943,487	$10,822,533
Other investments	2,308,144	2,205,019
Acc'ts receiv.	285,855	256,902
Cash	248,217	277,006
Total	$13,785,703	$13,561,460

LIABILITIES

Capital stock	$5,000,000	$5,000,000
Depreciation	5,914,758	5,488,759
Acc'ts payable	257,432	245,516
Surplus	2,613,513	2,827,185
Total	$13,785,703	$13,561,460

Cities Service Co.—Refining subsidiaries shipped 51,636 carloads of petroleum products in 1926, an increase of 18 per cent over 1925 shipments.

Mexican Panuco Oil Co. Adopts New Name

DOVER, DEL., Feb. 5.—Name of Mexican Panuco Oil Co. was changed to Intercontinent Petroleum Co. at the annual meeting here Jan. 26. This was done because the company has acquired properties in British Guiana, Guatemala, Venezuela and Colombia totaling approximately 8,000,000 acres.

Directors reelected are: Howard Willetts, Seth Low, William B. Lewis, Paul Hudson, R. C. Megargel, C. M. Barnett, A. S. Pratt, Frank Charcot, Jr., and J. Macy Willetts.

New directors are: Addison H. May, New York; formerly vice-president of the Southern Pacific railway in Mexico; Frederick B. Stimson, New York, and S. S. Strattan, Chicago.

United Oil Co. Bonds To be Redeemed

NEW YORK, Feb. 5.—The outstanding $5,000,000 United Oil Co. 6½ per cent first mortgage, collateral trust convertible bonds will be redeemed March 1 at 105 and accrued interest. These bonds are convertible into 13½ shares of United Oil stock for each $1,000 bond on or before Feb. 18. The United stock is convertible into Richfield Oil Co. stock at the rate of one of United for three of Richfield. These two companies of California were merged last year. Fiscal agents are Bond & Goodwin & Tucker, Inc., and Aronson & Co., New York.

Brokers Buy Simms Block

NEW YORK, Feb. 5.—Luke, Banks & Weeks, a New York Stock Exchange house, has taken an option of 97,000 shares of Simms Petroleum Co. held by the American International Corp. It is reported part of the block has already been acquired by the brokers and the rest will be taken over shortly. The price was not disclosed. The stock has been selling between 21 and 22. The American International paid $60 a share for it in 1920.

Additional Royalties Acquired

NEW YORK, Feb. 5.—North Central Texas Oil Co., spent $537,739 in 1926 to acquire fractional interests in royalties on 147,000 acres of producing and prospective oil land, it announced this week. The acreage is distributed as follows: Louisiana 40,889; Arkansas 45,960; Texas 49,038; Montana 960; New Mexico 6475, and Oklahoma 3678.

Transactions In Oil Shares on New York Stock Exchange

1925 High	1925 Low	1926 High	1926 Low		Listed Capital	Par Value	Stocks	Div. Rate	Last Paid	Transactions Week Ended Feb. 5 Sales	First	High	Low	Last	Ch'ge
.....	.....	32⅞	24¼	(sh)	814,800	N.P.	Amerada Corp.	50cQ	Jan. 31, 27	14,700	35¼	35⅞	34⅜	35½	+ ⅜
79¾	48	74	39⅜	(sh)	200,000	N.P.	American Republics	.....		1,300	48	48	44⅞	47⅜	— ⅝
47¾	32	59½	44¾	$	56,000,000	$ 25	Associated Oil	50cQ	Dec. 24, 26	.....	.....	.....	.....	.....	.....
117½	95½	128⅜	97		50,000,000	100	Atlantic Refining	.....	June 16, 24	9,900	110	114⅞	110	113¼	+4¼
117¾	113½	120	115⅛		20,000,000	100	do pfd	$1¾Q	Feb. 1, 27	200	115⅝	115⅝	115½	115½	— ¼
33½	18¾	33½	23¾		25,000,000	25	Barnsdall Corp. A	50cQ	Jan. 3, 27	119,200	31⅞	35	31⅜	33¾	+2¼
30	16	29½	22½		3,713,275	25	do B	50cQ	Jan. 3, 27	5,600	29	30½	29	30½	+1⅝
34⅜	23⅞	38⅛	29¾	$	47,594,950	$ 25	California Petroleum	50cQ	Dec. 1, 26	9,400	31⅛	31⅞	31	31⅝	+ ½
70	42½	94½	50		23,631,200	100	General Asphalt	.....		51,500	80⅝	85⅜	80⅝	84⅜	+3⅞
109	86½	140⅜	94⅞		7,354,000	100	do pfd	$1¼Q	Dec. 1, 26	100	124⅞	124⅞	124⅞	124⅞	+⅜
85	59	72	50¼		25,000,000	100	Houston Oil	.....		86,100	70	91½	70	90	+10½
41¾	13½	34	19⅝	(sh)	500,000	N.P.	Independent Oil & Gas	25cQ	Jan. 17, 27	58,500	30½	32¾	30	32	+1¾
14¼	5½	13¾	7¾	$	3,283,960	$ 10	Indian Refining	.....	Dec. 15, 20	12,100	8⅜	10⅜	8¾	9⅝	+1⅝
12⅝	6	12½	7½		4,546,490	10	do ctfs	.....		41,100	7¾	9¾	7¾	9¼	+1⅜
110	77	104	90		2,296,400	100	do pfd	.....	Dec. 15, 21	.....	.....	.....	.....	.....	.....
1½	¼	¾	¼		1,644,760	10	Kansas & Gulf	.....		.....	.....	.....	.....	.....	.....
.....	.....	24½	19⅛	(sh)	4,000,000	N.P.	Lago Oil & Transport	.....		1,900	21⅛	22	20¾	22	+ ⅝
28¾	13⅝	19⅞	12	(sh)	1,134,238	N.P.	Louisiana Oil Refining	.....		12,900	16⅜	16¾	16	16⅜	+ ⅛
.....	.....	97	95	$	4,000,000	$100	do pfd	$1¾Q	Nov. 15, 26	100	97	97	x97	97	+2⅜
35½	20⅜	28⅞	16½	(sh)	330,000	N.P.	Maracaibo Oil	.....		3,300	20¼	21⅝	20	21⅝	+1⅜
60½	32⅝	69⅜	49¼	(sh)	2,349,763	N.P.	Marland Oil Co.	$1Q	Dec. 31, 26	102,100	57	58⅜	56¾	57⅝	+1
250	225	.....	.....		45,942,800	$100	Mexican Petroleum	$3Q	Jan. 20, 27	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....		12,000,000	100	do pfd	$2Q	Jan. 20, 27	.....	.....	.....	.....	.....	.....
22½	29	13¾	6	(sh)	945,939	N.P.	Mexican Seaboard	.....	Nov. 15, 24	2,100	6⅞	7¼	6⅞	7	+ ⅛
38	25¾	37	27½	(sh)	1,357,800	N.P.	Mid-Continent Petroleum	.....	Aug. 1, 23	.....	38	.....	.....	.....	.....
94¼	83	104¼	90	$	6,718,000	$100	do pfd	$1¾Q	Dec. 1, 26	.....	104½	.....	.....	.....	.....
3¼	⅝	2½	¾		25,415,540	10	Middle States	.....	July 1, 23	25,900	2½	2½	2⅜	2⅜	0
1½	1½	1¼	½		4,384,680	.....	do ctfs	.....		1,000	1½	1⅝	1¼	1½	+ ⅛
78½	51⅝	83¼	1	(sh)	3,500,000	N.P.	Pacific Oil	.....	Jan. 20, 26	1,000	1½	1⅝	1½	1⅝	0
83⅞	59½	76½	56⅛	$	48,307,400	$ 50	Pan American P. & T.	$1.50Q	Jan. 20, 27	4,800	63½	64⅞	63½	64½	+2⅝
84½	60⅛	78⅜	56⅜		91,246,000	50	do B	$1.50Q	Jan. 20, 27	46,900	64⅜	65⅞	63⅝	65½	+2¼
49⅜	37¼	46	30	(sh)	400,000	N.P.	Pan American Western B	50cQ	Jan. 30, 27	1,000	36⅛	36⅞	35¾	36⅞	+ ⅞
6¼	2¼	32	4½	(sh)	198,770	N.P.	Panhandle P. & R.	.....		2,000	15	16⅛	15	15⅞	+ ¾
60½	37	99⅜	51	$	2,935,200	$100	do pfd	.....	July 2, 23	200	74⅞	74⅞	74⅞	74⅞	—2⅝
47⅛	36¼	57⅜	40	(sh)	2,406,736	N.P.	Phillips Petroleum	75cQ	Jan. 1, 27	112,700	56⅜	60	56⅛	59¼	+3½
3½	1¼	1⅞	½	$	29,622,925	$ 25	Pierce Oil Corp.	.....		2,800	⅝	¾	⅝	⅝	— ⅛
40	20¼	27⅛	11⅛		15,000,000	100	do pfd	.....	Feb. 1, 22	1,100	15¾	15¾	14⅝	14⅝	—1
8¼	4½	7	2½	(sh)	2,500,000	N.P.	Pierce Petroleum	.....		27,600	3¾	3¾	3⅜	3½	— ⅛
82⅝	12½	20⅞	11	$	11,467,850	$ 50	Producers & Refiners	.....	Sept. 15, 23	50,200	24½	26⅞	23⅞	25⅞	+1½
47⅝	27	41¾	30¾		2,845,350	50	do pfd	.....	May 1, 25	3,560	45½	49½	45½	48½	+3½
33¾	25⅛	31	25¼		75,959,250	25	Pure Oil Co.	37½cQ	Dec. 1, 26	24,200	28¼	29½	28¼	29⅛	+ ⅝
108½	103	112¾	106		18,000,000	100	do 8% pfd.	$2Q	Jan. 1, 27	.....	.....	.....	.....	.....	.....
57⅜	48¼	57⅜	47⅜	(sh)	659,082	13.40	Royal Dutch, N. Y. shares	$1.33¼	Jan. 28, 27	3,000	51⅛	51½	50⅝	51⅜	+ ⅜
49	39½	48⅝	40¾	(sh)	87,685	£2	Shell Transport & T.	96.7c	Jan. 17, 27	100	45½	45½	45½	45½	+ ⅜
28⅜	21⅝	30⅞	24	(sh)	10,000,000	N.P.	Shell Union Oil	35cQ	Dec. 31, 26	29,100	30⅝	31½	30½	31⅛	+ ⅝
106½	99½	114	103	$	18,350,400	$100	do pfd	$1½Q	Nov. 15, 26	.....	.....	.....	.....	.....	.....
28½	17¾	28⅝	15⅛		7,208,080	10	Simms Petroleum	50cS.A.	Jan. 3, 27	19,800	20¾	22	20⅝	22	+1⅛
24⅞	17	24⅞	16¾	(sh)	4,500,632	N.P.	Sinclair Consolidated	.....	May 31, 24	69,300	20⅞	22	20⅝	22	+1½
94⅜	78¾	99½	90	$	17,528,300	$100	do pfd	$2Q	Nov. 15, 26	3,400	102	103¼	x100¾	103	+3
32⅛	21¾	36⅞	26⅜		27,393,090	25	Skelly Oil Co.	50cQ	Dec. 15, 26	29,200	35½	36	34⅞	35⅞	+1⅛
.....	.....	63¾	52⅝	(sh)	13,016,434	N.P.	S. O. California	50cQ	Dec. 15, 26	28,200	59	60½	59	60	+1¼
47½	38⅜	46⅜	37½		517,064,800	25	S. O. New Jersey	25cQ	Dec. 15, 26	128,400	38¼	41⅜	38¼	40¾	+2⅛
119	116¼	119⅛	115		199,972,900	100	do pfd	$1¾Q	Dec. 15, 26	4,400	116	116⅛	116	116	0
.....	.....	33¼	32½		421,750,400	25	S. O. New York	40cQ	Dec. 15, 26	49,800	32¾	34⅛	32¾	33¾	+1
43⅞	38⅛	41⅝	30⅛	(sh)	1,171,951	N.P.	Sun Oil	25cQ	Dec. 15, 26	300	34	34	34	34	+ ⅞
6⅞	2	5¼	1	(sh)	1,121,568	N.P.	Superior Oil Corp.	.....	Dec. 20, 20	12,800	4¾	5	4½	4¾	— ⅛
55	42¾	58	48	$	88,092,200	$ 25	The Texas Co.	75cQ	Dec. 30, 26	1,200	56½	57	56¼	56⅞	+1
.....	.....	57⅞	53½		28,599,300	25	The Texas Corp.	75cQ	Jan. 1, 27	18,900	56¼	57	56¼	57	+ ¾
23⅜	10⅞	19½	12		8,380,340	10	Texas Pacific Coal & Oil	.....	June 30, 23	10,300	15	15½	15	15½	+ ⅜
36⅞	30¼	39¼	27	(sh)	2,138,543	N.P.	Tide Water Oil Co.	37½c	Dec. 31, 26	100	28½	28½	28½	28½	+1
101	99	103	87¼	$	20,705,100	$100	do 5% pfd.	$1.25Q	Nov. 15, 26	700	89	89	x 87½	87½	—1½
5⅞	3½	5½	3	(sh)	3,742,029	N.P.	Transcontinental Oil	.....		14,400	4½	4½	4¼	4½	0
43⅜	38	58⅜	37¼	$	40,668,950	$ 25	Union Oil of California	50cQ	Feb. 10, 27	17,400	53¾	55	53½	54⅛	+ ½
134	96¼	120	80		24,423,300	100	Union Tank Car Co.	$1¾Q	Dec. 1 26	500	96¼	97	94¾	94¾	—2¼
117⅛	113¼	118	113¼		12,000,000	100	do pfd.	$1¾Q	Dec. 1, 26	.....	.....	.....	.....	.....	.....
31¾	25½	29¼	25⅛	(sh)	490,000	N.P.	White Eagle Oil & Refining	50cQ	Jan. 20, 27	2,800	26⅜	27	26½	26¾	+ ⅜

*New High †New Low xEx-Dividend Total Sales 1,281,160

Cleveland Stock Market

Feb. 4

	Par	Bid	Asked	Last Sale
Canfield Oil Co.	$100	.....	.....	110
do pfd.	100	.....	100	100
Fred G. Clark Co.	10	.....	4	3¼
National Refining Co.	25	37½	39	38
do pfd.	100	130	.....	130
Paragon Refining Co.	25	6⅝	7	6⅝
do pfd.	100	66½	75	70

xEx-dividend

OIL DIVIDENDS

	Amt.	Payable	Stock of Record
Associated Oil q.	50c	Mar. 25	Mar. 5
do extra	40c	Mar. 25	Mar. 5
Beacon Oil pfd. q.	$1.87½	Feb. 15	Feb. 1
California Pet. q.	50c	Mar. 1	Feb. 15
Gen. Asphalt pfd. q.	$1.25	Mar. 1	Feb. 14
S. O. California q.	62½c	Mar. 15	Feb. 15
Swan-Finch pfd. q.	1¾%	Mar. 1	Feb. 7
Vacuum Oil q.	50c	Mar. 19	Feb. 28
do extra	50c	Mar. 19	Feb. 28

Standard Oil Co. of New Jersey—Hartshorne, Fales & Co., New York brokers, have issued a circular analyzing the stock of this largest oil organization.

PITTSBURGH STOCK EXCHANGE

1925 High	1925 Low	1926 High	1926 Low	Par Value	Stocks	Transactions Week Ended Feb. 4 Sales	First	High	Low	Last	Ch'ge
.....	.....	8½	6⅝	N.P.	Andes Petroleum	.....	.....	.....	.....	.....	.....
8¼	5¾	8½	5¾	$10	Arkansas Nat. Gas.	12,525	7¼	8⅛	7¼	8	+ ¾
.....	.....	90½	79¾	$100	Columbia Gas (w.i.)	30	84	85½	84	85¼	— ⅜
.....	.....	.....	.....	.....	do rts.	10	3	3	2⅞	2⅞	— ⅛
.....	.....	101⅜	95	$100	do pfd w.i	48	100	100¼	100	100¼	— ¼
18	14½	17	12½	$10	Devonian Oil	490	14	14¼	14	14¼	— ⅛
112⅝	105⅛	116¼	112	$100	Duquesne Lt. 7% pfd.	.....	.....	.....	.....	.....	.....
.....	.....	10	5⅛	N.P.	Houston Gulf Gas	640	6½	6¾	6½	6½	— ¼
.....	.....	46	39	25	Lone Star Gas Corp.	22,111	39	40½	38⅞	39½	+ ½
37¼	31	47⅜	33⅛	25	Ohio Fuel Corp.	.....	.....	.....	.....	.....	.....
.....	.....	47½	42	....	do ctfs. of deposit	.....	.....	.....	.....	.....	.....
.....	.....	6¾	5	....	Ohio Oil & Gas	.....	.....	.....	.....	.....	.....
34	26	34	21	25	Oklahoma Nat. Gas	.....	.....	.....	.....	.....	.....
.....	.....	21	19¼	....	do ctfs. of deposit	18,151	21¼	x23	21¼	22	+ ¾
8¾	5	5⅝	3⅛	5	Pittsburgh O. & G.	.....	.....	.....	.....	.....	.....
9⅝	6	10	7½	10	Salt Creek Cons.	28	7⅞	7⅞	7⅞	7⅞	0
13¾	8½	27	8	10	Tidal Osage	1,121	22⅝	24½	22⅜	24½	+2½
.....	.....	45	40	N.P.	Waverly Oil Wks. "A"	483	42¼	43	42¼	43	+ ½

PITTSBURGH CURB MARKET

1925 High	1925 Low	1926 High	1926 Low	Par Value	Stocks	Transactions Week Ended Feb. 4 Sales	First	High	Low	Last	Ch'ge
2½	.60	3⅜	2½	$5	Colombia Synd.	.....	.....	.....	.....	.....	.....
.60	.15	.20	.06	5	Duquesne Oil.	.....	.....	.....	.....	.....	.....
9	5½	22	22	10	Forest Oil.	.....	.....	.....	.....	.....	.....
32⅝	64	91½	85	25	Gulf Oil Corp.	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	....	Herbert Oil	.....	.....	.....	.....	.....	.....
.....	.....	79	79	100	Houston Gulf pfd.	.....	.....	.....	.....	.....	.....
12½	3¾	12	7½	N.P.	Leonard Oil & Dvlp.	9,080	9¼	10	9	10	+1
.....	.....	1⅝	1⅜	N.P.	Mountain & Gulf	.....	.....	.....	.....	.....	.....
.....	.....	30¼	29	....	Oklahoma Gas	55	31½	31½	31½	31½	—1
.47	.20	2	.15	10	Omar O. & G.	13,350	2.20	2.40	2.10	2.10	0
.....	.....	2	1¾	5	Pittsburgh Oil Dev.	.....	.....	.....	.....	.....	.....
27½	25	33½	20	10	Plymouth Oil.	220	26½	26½	26½	26½	0
7	3	7	3	5	States Oil.	.....	.....	.....	.....	.....	.....
4	1⅞	3½	2	$1	Texon Oil & Land.	700	2¾	2⅞	2⅛	2¾	0
.....	9	25¾	8	10	TidalOsage(non-voting)	.....	.....	.....	.....	.....	.....

*New High †New Low xEx-Dividend ‡Ex-Rights

Standard Oil Stock Traded in New York

1925 High	1925 Low	1926 High	1926 Low	Outstanding Capital	Par Value	Stocks	Div. Rate	Last Paid	Transactions Week Ended Feb. 4 Sales	First	High	Low	Last	Ch'ge
26⅝	17¼	21	16⅜	£ 4,000,000	£1	Anglo American	60¾cS.A.	May 27, 26	1,500	20¾	20¾	20⅛	20⅜	— ⅛
.....	.....	20¼	16½	.....	£1	do ctfs no -votg	.....	.....	700	20	20	19½	19⅝	— ⅛
.....	.....	19	19	.....	....	do voting ctfs	.....	.....	.....	.....	.....	.....	.....	.....
4¼	1¾	2¼	¾	(sh) 500,000	N.P.	Atlantic Lobos	.....	.....	.....	.....	.....	.....	.....	.....
12⅝	3	5	3⅛	$ 10,000,000	$ 10	do pfd	.....	.....	100	3	3	3	3	— ½
240	205	301	226	1,000,000	100	Borne Scrymser	$4S.A.	Oct. 15, 26	150	65½	65½	65½	65½	+ ½
.....	.....	70	49	.....	....	do new	.....	.....	.....	.....	.....	.....	.....	.....
72	53½	59½	42	10,000,000	50	Buckeye Pipe Line	$1Q	Dec. 15, 26	700	46	47¾	46¾	47½	+2½
74	48½	82½	65	3,000,000	25	Chesebrough Mfg	75cQ	Dec. 28, 26	300	81	81	80½	80½	0
115	110	.....	.....	1,000,000	100	do pfd	$1¾Q	Sept. 30, 26	.....	.....	.....	.....	.....	.....
31½	21⅞	25⅞	17⅝	34,914,280	10	Co ntinental Oil	25cQ	Dec. 15, 26	19,500	20⅝	22	20⅝	21⅞	+1¼
17½	10	17	13½	1,500,000	25	Crescent Pipe Line	.....	Sept. 15, 23	.....	.....	.....	.....	.....	.....
156	132	137	102	3,000,000	100	Cumberland Pipe Line	$3Q	Dec. 15, 26	1,230	129	134½	121	122	+10
96	61	63¾	43	5,000,000	100	Eureka Pipe Line	$1Q	Feb. 1, 27	650	49½	51¼	49½	50	+1½
68½	23½	32½	9⅞	16,000,000	100	Galena Signal Oil	.....	June 30, 25	500	12¾	13	12	12	+ ⅝
105	88	94½	35	4,000,000	100	do new pfd	.....	June 30, 26	20	49½	49¾	49½	49½	+4
114	95	97½	45	2,000,000	100	do old pfd	.....	June 30, 26	.....	.....	.....	.....	.....	.....
95	42¼	68¼	52	72,916,650	25	Humble Oil & Refining	80cQ	Jan. 1, 27	10,000	58½	61½	58¼	61¼	+3½
154½	127	144½	125¼	20,000,000	100	Illinois Pipe Line	$6S.A.	Dec. 15, 26	750	128½	129¾	128½	128⅞	+1⅝
39¼	27¼	39¾	31½	(sh) 6,491,852	N.P.	Imperial of Canada	25cQ	Dec. 1, 26	17,600	39¼	41½	39¼	41⅜	+2
84	57⅜	70	54¼	$ 5,000,000	50	Indiana Pipe Line	$1Q	Nov. 15, 26	2,000	68	69½	62½	67	+4
35⅜	22⅛	35¼	28¾	(sh) 7,118,138	N.P.	International Petroleum	25c	Nov. 15, 26	12,000	32¼	33	32¼	33	+ ⅝
25⅝	16½	20⅝	12½	$ 6,362,500	$12½	National Transit	25cQ	Dec. 15, 26	700	13	13⅞	13⅝	13⅞	0
79	49¼	51½	27⅛	5,000,000	100	New York Transit	.....	July 15, 26	550	31⅝	36	31⅝	35	+3½
88	67½	80½	64	4,000,000	100	Northern Pipe Line	$3S.A.	Jan. 1, 27	1,150	72½	75½	72½	74½	+1½
75¼	60¼	67⅜	55¾	60,000,000	25	Ohio Oil Co	50cQ	Dec. 15, 26	1,900	60	62½	61	62½	+2⅜
44½	19	24¾	15	10,000,000	25	Penn Mex Fuel	.....	May 21, 25	100	19	19	19	19	+1
65½	45⅞	60¼	48	60,000,000	25	Prairie Oil & Gas	50cQ	Nov. 30, 26	21,100	52½	54¾	x52½	54¼	+1¾
129¾	106	137½	122¼	81,000,000	100	Prairie Pipe Line	$2Q	Jan. 31, 27	3,900	134	140	134	137¾	+3¼
254	200	220	184½	4,000,000	100	Solar Refining Co	$5S.A.	Dec. 20, 26	10	198	198	198	198	+1
103	63	74½	21	10,000,000	100	Southern Pipe Line Co	.....	Mar. 1, 26	600	25¼	26⅛	25¼	26	+ ¾
47½	45	50	34½	20,000,000	25	South Penn Oil Co	50cQ	Dec. 31, 26	700	39	39¼	38¾	39¼	+ ¾
84	50	56½	49	3,500,000	100	South West Pa. Pipe Line	$1Q	Dec. 31, 26	600	55⅞	58	55⅞	58	+ ½
70¾	59½	70½	60½	$ 223,756,258	$ 25	S. O. Indiana	62½cQ	Dec. 15, 26	55,800	70¼	71⅞	70¼	71¾	+1⅜
46	30⅛	36½	16½	8,000,000	25	S. O. Kansas	.....	June 16, 24	1,100	19½	20	19¼	20	+ ¾
137	114¾	134⅜	108	16,864,434	25	S. O. Kentucky	$1Q	Dec. 31, 26	3,400	119½	120	118¾	120	+ ¾
.....	.....	51⅛	42	4,518,000	25	S. O. Nebraska	62cQ	Dec. 20, 26	1,100	48⅜	49½	48⅜	49¼	+1
.....	.....	.....	.....	.....	....	S. O. N. J. w. i	.....	.....	500	37⅜	40⅝	37⅜	40⅜	+2¾
369	338	365	288	14,000,000	100	S. O. Ohio	$2½Q	Jan. 1, 27	440	341	352	341	345	+4
123	116	122	117	7,000,000	100	do pfd	$1¾Q	Dec. 1, 26	110	119	122	119	120	+2¾
27	12	23	15	1,722,931	25	Swan-Finch Co	.....	Nov. 1, 19	160	15⅜	15⅜	14½	15⅜	+ ⅜
109½	80⅛	112	90¼	61,919,950	25	Vacuum Oil Co	50cQ	Dec. 20, 26	11,400	98¼	104	98¾	104	+6

NEW YORK CURB BONDS

Week Ending Feb. 4

	High	Low	Last	Ch'ge
Beacon Oil 6s '36	102½	102⅛	102½	+ ⅜
Cal. Pet. 5s	97	96½	96½	— ⅜
Cities Serv. 6s '66	101	100⅛	100⅞	+ ⅝
Cities Serv. 7s "D" '66	128	126	128	+3
Galena S O 7s '30	91½	91	91¼	+ ¼
General Pet. 6s '28	101½	101¼	101¼	— ⅛
Gulf Oil 5s '37	100⅜	100⅜	100⅜	0
Indepen. Oil 6½s '31	102½	101¾	102½	+ ¾
Pan Amer. Pet. 6s '40	100¼	99⅞	100¼	+ ¼
Pure Oil 6½s '33	103¾	103½	103¾	+ ½
Richfield Oil 6s wi '41	99	99	99	0
S. O. N. Y. 4½s '51	97⅞	95⅜	95¾	—2
S. O. N. Y. 6½s '33	105⅜	105⅛	105⅜	+ ⅛
Sun Oil 5½s '39	100¼	100	100¼	+ ⅛
Trans. Cont. Oil 7s '30	99⅝	99	99⅝	—2
United Oil Prod. 8s '31	71½	71½	71½	+3⅜
Valvoline 7s '37	104½	104½	104½	— ½

NEW YORK BONDS

Week Ending Feb. 4

	High	Low	Last	Ch'ge
Amer. Rep. Deb. 6s	99½	99	99½	+ ½
Assoc. Oil gold 6s	103	102¼	103	+ ¼
Atlantic Refg. deb. 5s	101½	101	101¼	— ½
Barnsdall Corp. 6s	106⅜	104⅜	106	+1⅝
Barnsdall Corp. 6s ex war.	94½	93½	93¾	0
Cal. Petrol. sf 6½s	103⅝	103½	103½	0
Calif. Pet. Cor. 5½s	101⅝	101	101⅜	+ ⅜
Empire Gas & Fuel 7½s	110⅛	107½	108	0
Empire Gas & Fuel 6½s	110½	106	110⅜	+3⅜
Gen. Asphalt 6s	108	108	108	+1
Gen. Petroleum 5s	101¼	101	101¼	— ⅛
Humble Oil & Refg. 5½s	102½	102¼	102½	0
Mid-Cont. Pet. 6½s	105¼	105	105⅛	+ ⅛
Pan-Amer. P & T 7s	105¼	105¼	105¼	0
Pan-Amer. P & T 6s	106	105½	106	+1
Pierce Oil deb 8s	101½	101¼	100⅜	+ ⅜
Simms Pet. cvt. 6s	103⅞	103⅜	103¾	+ ¼
Sinclair Con. Oil Col. 7s	102⅜	101⅜	102⅜	+1¼
Sinclair Con. Oil Con. 6½s	102⅛	99¾	101¼	+1¼
Sinclair Con. Oil 6s	102⅛	100⅞	102⅛	+1½
Sinclair Crude Oil 6s	100⅞	100⅝	100¾	0
Sinclair Pipe Line sf 5s	95⅜	94⅜	94¾	+ ⅛
Standard Oil N. J. deb 5s	102⅜	101⅞	102	— ¼
Union Oil of Cal. 6s-A	108⅞	108⅞	108⅞	0
Union Oil of Cal. 5s-B	101½	101½	101½	0
Union Oil of Cal. 5s-C	99½	99½	99½	+ ⅛

Standard Oil Co. of New York—$50,000,000 25-year 4½% debentures, due Dec. 15, 1951, admitted to New York Stock Exchange in exchange for temporary debentures or interim receipts.

New York Transit Co.—All directors and officers re-elected.

New York Curb Market

1925 High	1925 Low	1926 High	1926 Low	Par Value	Stocks	Transactions Week Ended Feb. 4 Sales	First	High	Low	Last	Ch'ge
11½	2½	14½	4	$ 5	Amer. Maracaibo	31,600	5⅛	5¾	4⅞	5⅝	+ ⅜
8⅜	5	8⅜	5¾	$ 10	Arkansas Nat. Gas	4,800	7½	8⅜	7½	8⅛	+ ½
.....	.....	19⅜	14⅛	N.P.	Beacon Oil	3,400	18¼	18⅜	17¾	18⅜	+ ¼
47½	38	83½	82	$ 25	British-American	900	18¼	23⅛	18¼	23	+1
10¼	2¾	28⅜	9¼	25c	Carib. Syndicate	3,300	24¼	24¼	23⅝	23¾	— ⅜
43	35	51	37½	$ 20	Cities Service	47,200	54¼	57	54¼	57	+2¾
85½	80¼	92½	82⅜	100	do pfd	6,000	91⅝	92¼	91½	91¾	0
8	7¼	8⅜	7⅜	10	do pfd. B	600	8⅛	8⅜	8¼	8⅜	+ ¼
21⅜	17½	25¼	19	10	do bankers' sh	100	27	27	27	27	0
2¾	.60	3½	1¾	N.P.	Colombia Syndicate	35,900	3¼	3 1/16	3 1/16	3¼	— 1/16
15	8¼	16	10	N.P.	Creole Syndicate	26,300	14	14¼	13⅜	13⅜	— ⅜
12¼	5	7⅜	1⅜	N.P.	Crown Central	3,500	2½	3	2½	2⅞	+ ⅜
7	2	4	1⅜	N.P.	Derby Oil & Ref	700	2¼	2¼	1½	1⅝	0
27	10½	19	13	N.P.	do pfd	800	10½	10½	10½	10½	0
.....	.....	2¼	.60	....	Euclid Oil	.....	.....	.....	.....	.....	.....
6	1⅜	7½	2½	N.P.	Gibson Oil	10,900	2⅞	3⅛	2⅞	3	0
3¾	1⅛	2	.63	N.P.	Gilliland v.t.c	1,900	1⅜	1⅜	1⅜	1⅜	0
98¼	63½	98	82	$ 25	Gulf Oil Corp	5,000	94⅛	96½	94⅛	96	+1¾
5⅞	2¼	4	1	N.P.	Kirby Petroleum	2,100	2¼	2¼	1¾	1¾	— ½
13	6	12¼	5¾	N.P.	Leonard Oil & Dev	31,500	8⅞	10¼	8¾	10¼	+1⅜
25⅞	18	27	20	N.P.	Lion Oil Refining	17,900	26¼	27½	26	27	+ ½
.....	.....	46	31½	$ 25	Lone Star Gas	500	39	40	39	40	+3
4¼	1¾	3⅜	1½	N.P.	Marland of Mexico	.....	.....	.....	.....	.....	.....
5¾	.56	5½	1⅞	$ 10	Mexican-Panuco	17,200	2¼	2½	2	2⅜	+ ⅛
2	1	1¾	1¼	1	Mountain & Gulf	100	1½	1¾	1½	1½	0
26¼	18⅜	26	22½	10	Mountain Prod	4,900	26	27	25⅞	26⅛	+ ⅛
6¾	3⅝	6¾	5	5	New Bradford	900	5⅝	5¾	5½	5½	0
24¾	16¼	11¾	2	10	New England Fuel	200	5¾	5¾	5¾	5¾	0
19⅜	6¼	17	9⅛	1	New Mex. & Ariz	1,200	11½	12½	11½	12½	+ ⅞
12½	8¼	17	8	25	New York Oil	2,800	10⅜	11	10⅜	11	+1¾
37	14	36	34¼	25	Ohio Fuel Corp	.....	.....	.....	.....	.....	.....
.....	.....	9⅞	6	N.P.	Pandem	10,900	7¼	8⅛	7⅛	7⅜	+ ⅜
2½	.90	2¾	.20	N.P.	Peer Oil Corp	.....	.....	.....	.....	.....	.....
28¼	16	22¾	12	$ 10	Pennok Oil	100	12¾	12¾	12¾	12¾	0
44½	16	38	14⅛	25	Red Bank Oil	200	21⅛	21⅞	21⅛	21⅞	+2⅞
33½	19	28¾	12	N.P.	Reiter-Foster	2,900	12¾	14	12¾	13¼	+ ⅜
.....	.....	27½	22	$ 25	Richfield Oil w.i	.....	.....	.....	.....	.....	.....
9½	3½	7½	4½	N.P.	Ryan Consolidated	1,800	6	6¾	6	6½	+ ⅛
9¾	6⅛	10	7½	$ 10	Salt Creek Cons	3,300	7¾	8	7¾	7⅞	+ ⅛
35	24	36	26⅞	10	Salt Creek Prod	2,000	31	31¼	30¾	31⅛	+ ⅛
3⅞	1	4⅜	1⅛	5	Savoy Oil	1,400	6¼	6¼	5	5	—1⅜
13⅜	9	27	7⅜	10	Tidal Osage	3,200	21⅞	24⅞	21⅞	24⅝	+3⅝
10⅞	8	25¾	8¼	10	do non-voting	2,700	20	22⅜	20	22⅜	+2⅜
.....	.....	27	20⅞	N.P.	Tide Water Assoc	6,400	22½	22¾	22½	22½	— ⅛
.....	.....	99¼	93¾	100	do pfd	1,900	94¾	95	94½	94⅞	+ ⅛
4⅞	1¾	8	4¼	5	Venezuelan Pet	15,900	6⅞	7⅛	6½	7	+ ⅛
.....	.....	29¾	23½	N.P.	Warner-Quinlan	100	25½	25½	25½	25½	0
31¼	22⅛	36⅛	22	N.P.	Wilcox O. & G. new	4,900	30⅛	31½	30⅛	30½	+ ⅜
7	3⅞	9½	4⅜	$ 1	Woodley Petroleum	200	7¼	7¼	7¼	7¼	— ⅛

*New High †New Low xEx-Dividend

Tank Car Figures Reveal Efficient Railroading

CLEVELAND, Feb. 5.—How well the railroads are doing in handling shipments of petroleum is shown by a comparison of the increase in the number of tank cars in the United States with the increase in domestic gasoline shipments.

In 1918 domestic gasoline shipments totaled 3,129,266,000 gallons, Bureau of Mines statistics show. That year there were 96,034 private and railroad owned tank cars, according to a compilation by the Conley Tank Car Co., Pittsburgh.

In 1925 domestic gasoline shipments totaled 9,362,094,000 gallons and the number of tank cars was 150,209. While gasoline movement had tripled in eight years the number of tank cars had increased only 56.2 per cent. And the great increase in movement of crude oil, kerosene, lubricating oils, gas oil, distillates, and fuel oil was handled by that relatively small increased number of tank cars.

In 1918 10,471 cars were owned by the railroads and 95,563 by oil and tank car companies. In 1925 the railroad fleet had grown to only 12,250 and the private company fleet to 137,959.

The comparison reveals strongly the improved and more rapid service given petroleum shipments since the return of the management of the railroads to their owners.

Independent's Profits Rise

NEW YORK, Feb. 5.—Net income of Independent Oil & Gas Co. in 1926 was $3,027,628 or $6.05 a share, after depletion, depreciation and federal income taxes, compared with $2,500,944 or $5 a share in 1925. Fourth quarter earnings after all reserves averaged $2.53 a share compared with $1.66 a share in last quarter of 1925.

Standard Oil Co. of California—Dividend rate increased to $2.50 from $2 a year, beginning with quarterly payment Mar. 15. Extra quarterly dividend of 12½ cents a share payable March 15 to stock of Feb. 15 record, is maintained would bring annual payments to $3 per $25 share.

Gasoline Plant Enlarged

LOS ANGELES, Feb. 5.—The Ryan & Hackett natural gasoline plant, known as No. 11, located at Long Beach, recently has been increased in capacity, until the plant is now making 2000 gallons of natural gasoline daily. The plant is made up of small Ryan & Hackett portables, with rated capacity of 200 gallons each, although each unit is now producing double rated capacity. The gas from the lease drawn upon by this plant now has a gasoline content of three to three and a half gallons to the 1000 cubic feet. All of the gas at Long Beach is not this rich, while some leases are richer than others.

Market Section

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EXPERIENCED MARKETER 15 years thorough knowledge tank wagon and service station distribution, my specialty station auditing, go anywhere. Box 780.

EXECUTIVE—Twenty years experience marketing petroleum products in the East. President and General Manager of five million dollar corporation at present. Services will be available April 1st. Box 778.

MAN, 38, TWELVE YEARS EXECUTIVE OIL EXPERIENCE in traffic, refining, marketing and filling stations, desires connection with marketer, jobber or refiner. Can qualify as buyer, sales agent or general representative. Go anywhere, Houston, New Orleans or Florida preferred. Box 785.

I HAVE A FINE POSITION NOW *BUT—*

I am not satisfied. I want more scope, more action. I am 37, single, technical graduate with fourteen years successful record in almost every phase of the oil business, particularly in the management of exporting properties.

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To sell on liberal commission basis, nationally known Gasoline Hose and Couplings. Reply must state in detail lines you are now selling, and exact territory covered. Box 772.

PRODUCTION MAN WANTED

of at least eight years experience in handling rotary and cable tools as well as production from wells at least 4000 ft. in depth or from Wilcox Sand. State in first letter qualifications and salary expected. Personal interview will be granted applicant by appointment only.

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for complete Pennsylvania Refinery, including cracking, bright stock and wax plants.

In reply state age, give references, experience and salary expected.

Box 784

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In principal oil fields, for sale of special chemicals which will break up oil emulsions without mechanical means. Excellent sales possibilities and large commission.

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Patent Attorneys

INVENTORS who derive largest profits know and heed certain simple but vital facts before applying for patents. Our book Patent-Sense gives those facts; sent free. Lacey & Lacey, 679 F St., Washington, D. C. Established 1869.

For Sale

BULK STATION FOR SALE OR LEASE, at Youngstown, Ohio. 40,000 gallons storage completely equipped. Also exceptionally well located service station. Write Box 786, care of National Petroleum News.

THREE-TON INTERNATIONAL TANK TRUCK FOR SALE

Pneumatic tires, speedometer, lighting and starting system, been run 17,000 miles, new rubber on rear, guaranteed to be in good condition all over, 800-gallon semi-elliptical 4-compartment Heil tank good as new. Will sacrifice at real bargain or will sell one without other if preferred.

Box 782

Economy in Production

Do you realize how many hundreds of thousands of dollars are lost annually by accumulation of used engines, drilling equipment, etc. in refineries, warehouses or on leases?

Don't let your money be tied up in anything you don't need. Look over the equipment you're not using and write us about it. We'll sell it to some of our 15,500 readers.

Miscellaneous

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